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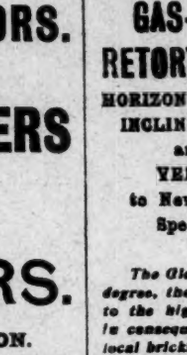

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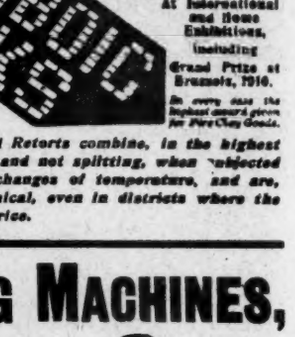

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EDITORIAL NOTES.

Charges and Inerts.

THE potential capacity of the gas industry for improving its position lies not only in material development in its manufacturing operations, and in bringing to account higher economies and efficiencies, but in revising trading methods, some of which have been in operation over the greater part of the history of the industry. One means of doing this may be by the alteration of the basis of charge, and making it apply to the heating value of gas (which is the thing that matters in these days) rather than to the volume. Mr. Charles Carpenter, D.Sc., has been recently addressing himself to the mode in which this change could be easily effected; and to his proposals a general reference is to-day made on a subsequent page.

But a matter of equal importance to the industry is that there are persistent rumours current that the Board of Fuel Research are reporting to the Board of Trade in favour of a limitation of the inert constituents of gas which, if the percentage mentioned be true, will represent working on the most refined scale. It cannot be authoritatively said what is the percentage suggested in the final draft of the report; and, whatever it is, it may, for aught we know, have attached to it conditions that will not have the feared delimiting effects for the industry in working for higher economies and efficiencies. The coal used for gas making is not the same throughout the country, nor is the carbonizing plant; and, in the process of time, all plant must fall away to some extent from the well-conditioned character of its early days. All these facts are known to Sir George Beilby and his colleagues, as well as they are to the professional men of the gas industry. Therefore, we are hopeful that they will not make, or have not made, a proposal of such a character that it will be detrimental to the progress of the industry. Anything in the way of limitation of inerts can only at the present time be of a tentative character, seeing that the investigation of carbonizing methods and gas use has only just opened up; and Professor Cobb and his associates have, under the conditions of the tests they have made, shown that, while avoidable inerts are not useful companions for the other constituents of the gas, their association with them has not, for certain purposes, such a deplorable effect upon thermal efficiency as prior information had suggested. If, therefore, the charge for gas is in future made upon a heat basis, a narrow limitation of inerts would not, for most heating purposes, be so necessary.

There is another point affecting the question of the conditions on which incombustible restrictions may be based. There are among many men in the gas industry—and this is a point which is of importance to the Fuel Research Board, and to the subject of coal use and conservation—large views in existence as to the place the industry should occupy as gaseous fuel providers for all heating purposes and in all industries. There are some engineers considering and proposing the complete gasification of coal; and no system of complete gasification of coal has yet been discovered in which the inert constituents could be kept down to anything like the limits that rumour has named. All we want to ensure is that no hasty legislation shall adversely affect the natural development of the industry, and its possibilities in serving the country. This should be the very last thing desired by the Fuel Research Board. Sir George Beilby himself has said—this at a meeting of the Royal Society of Arts—that the manufacturers of the country want a much cheaper gas. We agree. We also realize that if they cannot get cheaper gas from the industry, they will themselves in the large establishments—which are becoming larger than ever through fusion of interests—become their own gas manufacturers; and we know that coal used in small units of plant gives less efficient service than when dealt with on a larger well-ordered scale, as in a gas-works. We have only to look at the arguments which have been advanced in justification of the reorganization of the electrical industry's generating work, to see the condemnation made by Departmental Committees of the individual use of coal for steam-raising for manufacturing purposes. The same argument could with more effect be applied to gas manufacture by individual firms.

Coal and Industrial Economics.

AN industry such as that of gas supply which can only export certain secondary products, but not its primary product, is very largely dependent for its success upon the internal industrial circumstances or prosperity of the country; and prosperity is largely a question of the cultivation and maintenance of the most conducive economic conditions. At the moment economic conditions are, through the war, more or less out of gear, and our industrial position is in a state of chaos. It is therefore more essential than ever that we should take the broadest possible survey of our economic situation, in order to keep well in view, and make straight for, those objectives which will in the new order of things enable us, or help us, to retrieve our position and improve upon it as quickly as possible. We are rather too prone to take a narrow view of these matters—the narrowness depending very much upon our immediate interests. We speak of our native stores of coal as being fundamentally necessary to the country's prosperity. So they are. We speak of the cost of the production of coal and the price at which it is sold as though these comprise all that matters in considering the relation of coal to our economic position. Just now a Coal Commission is sitting, and considering primarily wages and hours of labour in the mines. These are highly important factors; but they are only a contribution to the great interactionary part that British coal takes in maintaining the place of the British Empire in the world's affairs, and in making for progress.

We are invited to leave, and in fact are carried from, the narrow view of coal in relation to its economic status and influence by Professor W. A. Bone, in the Cantor Lectures he is this session delivering at the Royal Society of Arts. We are being shown something of its interactionary industrial movements. We are being shown that coal leads the whole of the factors which make for fulness in our industrial life—not only through the direct supply to, and use of coal by, industries, but from the position it occupies in our mercantile marine system, and the *rôle* it takes in drawing and bringing to this country the raw materials without which industry and trade here could not survive. The war has produced an economic metamorphosis; and unless we can improve our coal position, other countries whose coal conditions are easier will gradually crush out of all recognition the supremacy which we formerly held in the many ways instanced by Prof. Bone. America is powerful, both in water and coal power; and its water power must not be forgotten when consideration is being given to our relative positions in both the manufacturing and the trading world. We have a good geographical position, we have large coal resources lying near to our coast line, and we have good supplies of iron ores. But America is beating us out and out in coal production per man and in cost per ton. Part of this we cannot avoid. Nature has ordered otherwise. It has been fully proved at the Coal Commission that this is to our trading detriment; and we must not overlook Prof. Bone's anxiety that this country shall not forfeit the requisite incoming of raw materials from abroad through not being able to maintain its position in the matter of coal exports. This is not the time to go experimenting with the position of coal as a primary factor in our economic system. It should by natural means bring all its force to bear in the work of national recuperation and expansion.

There is resistance to this—not by design, but through

self-interest. In a measure the self-interest is justified. The miner should be fairly rewarded for his work. As a partial set-off to increase in producing costs in this direction, the evidence before the Coal Commission has shown us that there are economies which could and should be achieved in the production; and Prof. Bone is as strong as he has ever been upon the point of manufacturers exercising every possible economy—the ways are many—in the use of coal. The gas industry stands among the manufacturers. Coal is going to cost more; and therefore the utmost must be got out of it. There is a value in it no part of which must be wasted. "In the times that are ahead of us," wisely said Prof. Bone, "every possible real economy will have to be "exercised, and all unproductive expenditure be ruthlessly "curtailed." This series of Cantor Lectures will assist all coal users to take a broad view of the coal situation, and of the ramifications of coal in the country's prosperity.

Mr. Frank Livesey on the Work at Hand.

The problems that confront the gas industry to-day are many and vitally important; and the sharpest brains that the industry possesses should be brought into action to determine how best to deal with them. Had Sir George Livesey been with us to-day, he would have found the problems of these times of a character with which he would have liked to have matched his energy, initiative, and will, first with the view of effecting greater economy and efficiency in production to counteract the increased, and of a surety permanent, costs that have come upon the industry; secondly, to give the industry the gas which would meet the dual claims of industrial and domestic heating and coal conservation; and, thirdly, to ensure that those who with confidence have placed capital and savings in the industry did not suffer. We see the broad view of the necessities of the situation, the perception of requirements, the fairness to investors, the need for stabilizing the industry under the new economic conditions, all standing out clearly in the Presidential Address which the bearer of the honoured name—Mr. Frank Livesey—delivered to the members of the Southern Association last Thursday. He is optimistic that ways will be found by which matters will be righted, bad as they have been, bad as they are. But such optimism must be accompanied, and that immediately, by hard concentrated work from within the industry.

The industry has been heavily strained. It has shown a great deal of elasticity; and it has divulged that the bottom of its resources in achieving a higher economy and efficiency has not yet been touched. Were it otherwise, its outlook would be gloomy indeed, especially in the Southern counties. There the war-time severities have been felt by gas undertakings with greater intensity than perhaps in any other parts, owing to distances from the coalfields, and the fact that so much of the gas coal requirement is seaborne. The undertakings have had to bear not only the increased cost of coal at the pit head, but freights that have been monstrously burdensome; and it is mainly in this direction that, without effort, some early amelioration of the conditions may be looked-for. It is perfectly obvious that too much hope must not be based on any recession of labour from the high ground which it has adventitiously gained through the war. The union leaders are not all Appletons; and the rank-and-file think it politic to confide their interests to their leaders, or, where the leaders are of the philosophic, far-seeing kind, and consider causes and effects, the men have "kicked over the traces," and sought to gratify their ill-considered claims by one irregular means or another. We thoroughly agree with the President that it would be very unwise to abrogate for awhile the Price of Coal Limitation Act—in fact, it may be prudent to extend it, if the position of coal supplies and stocks is not what it should be when the time of its prescribed expiration is approaching. To allow with stocks low an uncurbed competition for coals on the cessation of the operation of the Act, would only result in rises of prices and wages, and in a permanent serious effect upon the prosperity of the country. This must be guarded against.

It is from within the industry that initiative has to come, which, through the channel of Parliament, must help to annul the effects of a higher standard of cost per unit of gas production. We are glad to find the President is not one of those who would, because of minor difficulties, lightly abandon the lessons as to higher efficiencies and economies that have been produced during war time. It would ill-become the profession of gas engineering if it allowed minor difficulties to cheat the industry of those gains which are financially valuable not only to the industry but to consumers. "I find that at Maidstone," observes Mr. Livesey, "on every occasion prior to the war when the quality of "the gas had been reduced, a purchaser has, by the opera-"tion of a reduction in price, been able to obtain greater "heating value for his gas than he obtained before." We have heard, too, of greater storage being required for the lower calorific power gas. The President does not think this an important point, seeing that greater elasticity of production enables sudden demands to be met without quite the same storage capacity as is needed for straight coal gas. In this connection, too, we are bidden—not by Mr. Livesey—to consider the question of selling heat energy in concentrated form or in more attenuated form. This is not the only question. There are others. Are we to consider the heat energy sold at per cubic foot of gas or per ton of coal used? To sell heat energy in concentrated form puts a very strict limit on the heat energy recoverable in gaseous form per ton of coal; and, the higher the concentration, it gives to the consumer a gas which is not the best for him through the greater resistance there is to the thorough admixture of the necessary air for complete combustion, and the larger quantity of air that is required for this purpose. We must have the greatest possible elasticity in the gas industry, consistent with the uses to which gas is put, in order to bring to credit the highest economies. In considering the question of steaming, Mr. Livesey suggested the presentation of the fullest details as to the working of verticals. There are gas engineers who are doubtful as to a complete balance-sheet having been placed on the table. There are some who talk about the coke required to produce the steam, and the reduction of the weight of coke through the formation of water gas in the retort, as not having been faithfully taken into account. It should not be difficult for those engineers who know anything about steam-raising and the manufacture of blue water gas to make for themselves a fairly close computation as to the effect of steaming upon the coke for sale. While they are doing this, they must place on the other side the ascertained facts, that the action of the steam on the charges is: To extract more heat energy from the coal; to prevent some of the decomposition losses of valuable constituents, and transfer them to the gas; and to have more gas and ammonia for sale per ton of coal carbonized.

Where horizontal retorts are used, and particularly where Durham coals are carbonized, some engineers have a preference for using for dilution blue water gas separately produced. This reduces the B.Th.U. per cubic foot to a greater extent than steaming in vertical retorts for an equal volume of product per ton; and it limits the total volume of the mixture on the "per ton of coal" basis. With his horizontal working, Mr. Livesey has a preference for using blue water gas, though in one small works with which he is connected 15,000 c.ft. per ton has, under Mr. Rew's system, been obtained with steaming and horizontal working. Using blue water gas, there must be care not to have too great variations in the mixture. Mr. Livesey's experience is that variation from a mixture of 10 to 20 p.ct. is a satisfactory limit, and wide enough to allow the daily make of water gas to remain constant, in spite of variations in the make of coal gas owing to different qualities of coal. For convenience, Mr. Livesey mixes his blue water gas at the inlet of the exhausters; but he is in favour of mixing at an earlier stage. By the passing of the blue gas along the foul main, it is enriched by picking up tar vapours. This earlier mixing is a matter on which other engineers have had experience; and it is one on which Mr. Livesey would like to have the results of that experience recounted.

The President is inclined to think, with a good many other men, that the gas of the future will be of lower calorific power than 500 B.Th.U. gross. In this connection he makes some sapient remarks as to gas-using appliances, to which remarks heed should be paid by manufacturers of geysers, gas-fires, cookers, and lighting burners. There is something in the comments for the manufacturers of each type of apparatus. For the lower calorific grade gas, it should not be beyond the power of invention to make a satisfactory geyser. There is no trouble with gas-fires; they can in the necessary details be readily improved to accommodate themselves to lower-grade gas. There is the gas-cooker. Here, again, a lower-grade gas can be used without loss of thermal efficiency. But manufacturers might note

the structural details of the "Maidstone" regenerator gas-cooker, which, tests assure the President, saves 5 p.ct. of the consumption in the oven and 15 p.ct. on the top-plate. Heated air in regulated quantity is supplied to the oven; and bars over the boiler-rings are dispensed with. These bars are excellent conductors and dispersers of heat.

There is the financial problem, which is a very serious one. The industry must have its financial position re-established. As the President says, to continue under the present conditions is impossible. The conditions of relief that are given must be permanent; for it is patent that factors which have to be taken into account in considering the terms under which the industry operates have changed not temporarily, but permanently. The conditions, too, must be such as will not sacrifice the interests of those who have invested in the industry in the past. This is a subject that is also discussed in the address; and Mr. Livesey is confident that if relief is given to gas undertakings, the gas consumers will not suffer. This is a submission with which every financier and every business man will agree.

The address was excellent in its every part. In a perfectly unprejudiced manner, it focusses attention on those things which the industry can only neglect at its peril.

Modern Methods in the Smaller Works—Meter and Stove Prices.

There is no necessity, or perhaps it would be more correct to say that there was no necessity before the war, for the smaller gas undertakings not working under modern methods within their limits. Those that are not so working are a reflection on the ability of their engineers and administrators. One or other or both are not progressive. Administrators are frequently to blame for not appreciating that money well spent on a gas-works is profitable. But the fault is not always that of the administrators; they are sometimes badly led by a sleepy manager, whose greatest care is not to have the even tenour of his ways disturbed. The new President of the Midland Association of Gas Engineers and Managers is Mr. A. T. Harris, whose family association with the management of gas-works runs back to the early decades of gas supply. Market Harborough is the seat of the President's activities; and as we read the modestly told story of experiences, and the concise review of the conditions under which the gas industry has lately been labouring and is still operating, those among us capable of forming judgment can say that Market Harborough is to be congratulated upon the progressiveness of a gas manager who has not the latitude that the manager of a larger works enjoys. When he took charge of the works now a little less than twenty years ago, it could not have been encouraging to him to find the capital charges amounted to 1s. 3d. per 1000 c.ft. But to be able to say that these charges now amount to 9d., and that the works have been practically reconstructed and greatly enlarged out of revenue, until they are capable of meeting a much larger demand than the present output of 60 millions, is a performance that marks personal capacity.

At Market Harborough there are, we know, good manufacturing results; but perhaps a natural reserve on the part of Mr. Harris caused him to refrain from specifically mentioning them other than in general terms. The causes to which he attributes part of the good results will be found in the address. What most interests us at the moment is that charge steaming is practised at Market Harborough with horizontal retorts; and a test shows a make of 15,000 c.ft. of gas of 490 B.Th.U., as determined by the total-heat calorimeter. Mr. Harris has found what other users of steam with the comparatively shallow depth charges of horizontal retorts have discovered, that it is necessary to super-heat the steam, as otherwise the tar and liquor are the sufferers in company with gas production results. He finds, too, a pressure of 15 lbs. is the most suitable. One retort in five is steamed; and this is emptied and recharged every twenty-four hours. One-half of the retort—at the steam admission end—is charged with two-thirds coke breeze and one-third coal; the other half being all coal. The quick heating of the breeze permits the steaming to be commenced on a reduced scale within a short period of charging; the maximum point of steaming being reached eight hours after charging, and then regularly continued for sixteen hours. Interest would be much enhanced if Mr. Harris could ascertain, if he has not already done so, what would be the effect of passing the gas so produced continuously and directly through one or more of the unsteamed retorts. In this and other ways, it is quite clear management has made its impression on working and other costs to the substantial advantage of Market Harborough. Another point of interest is that, in connection with the public lighting, the "A and M" pressure-wave system has been installed; and this was found of considerable use on the occasion of one of the Zeppelin raids.

In the President's comments on current topics, he referred to the "excessive" cost of meters and stoves, and to the effect of this upon the restriction of business. We are not at the moment in a position to judge whether the adjective is altogether justified. Manufacturers avow they are not charging excessively. Naturally, their costs for labour and material have shot-up in something like coincidence with the costs in other engineering trades; and this is round about 100 p.ct. increase. The President points out that this must tend to restriction of business. There is not the slightest doubt that it will—especially as it means that, if there is not before long some substantial decline in prices, meter and stove rentals will have to be raised, and the prepayment conditions will have to be altered where the annual consumption of gas is of a low order. With capital dearer, the position is aggravated. But it must not be forgotten that restriction of business cuts both ways. Manufacturers are looking for an enlargement of output to reduce costs; but this enlargement of output will not be obtained if there is any curtailment of the gas business through meters and stoves being at a price beyond what is justifiable. It will be for manufacturers and gas suppliers to do their utmost to help each other in the present circumstances; otherwise both will suffer.

A Large Union of Gas-Stove Interests.

These are days not only of reconstruction but of construction in divers forms. Construction may be of an order which has for its purpose the production of economies, to realize at any rate a partial compensation to the new economic conditions which are upon industry, and a large part of which is irremovable. Among the new constructive plans in which the gas industry will have immediate concern is the decision to effect a union of interests (and of brains) by the John Wright and Eagle Range Company, Ltd., the Richmond Gas Stove and Meter Company, Ltd., and the Davis Gas-Stove Company, Ltd. Each of the businesses is to maintain its old identity. It would be a pity were it otherwise, as the names of these progressive firms have become household words in the gas industry. Now that agreement has been arrived at, there is no need for secrecy as to the proposals and the anticipated benefits. The capitals of the three companies will be vested in a holding company; and outwardly there will be no other change. It is internally where change will be effected of a character which it is confidently believed will be of mutual advantage to the gas industry and the firms themselves.

Suggestions as to amalgamation of the companies are no new thing. They have been made before over a series of years, but for one reason or another have not hitherto matured. Never before, however, has a position developed of the present character, which, it is believed, points unerringly to consolidation into a powerful organization being in the general interests. Our concern in the matter lies largely on the side of the gas-supply industry; and, examining it from the point of view of the industry, it is quite easy to see that, though the union may mean some reduction of competitive effort, advantages will accrue, though these, it is inevitable, must be progressively cumulative, and not an immediate realization. Under the standards of cost that new conditions are imposing, and will continue to impose, and which conditions apply to all manufacture, it is obvious that the combination of interests will, in the first place, enhance power in the purchase of materials. There should also be a reduction of competitive expenses, which are heavy in such a trade. There will be a saving in duplication in the weighty manufacturing expenses involved in producing the types of goods made by the companies. These are things which, with mass production and standardization of parts, should result in economies which, as time progresses, should find expression in the prices charged, though, whatever the best that can be done, it is too much to hope that the level of prices of former days will be again reached.

There are some other considerations. The gas industry knows full well that for it competition is going to be keener, and that it will have to meet it by producing a gas which

will put into the distributing systems throughout the country a larger amount of the thermal energy of the coal carbonized. The keener competition with the gas industry, and its own development, will require that the gas-consuming appliances shall in the new circumstances possess the highest possible efficiency. The industry will therefore require all the energy that the manufacturers can bring to bear; and the trinity of makers concerned in this union of interests are intending that part of their work of reorganization shall be the early concentration of laboratory research and control in a form which individually they are unable to accomplish. This is an excellent point. Standardization of parts will likewise be a gain to gas undertakings which have business dealings with more than one of the companies. With all this, as our advertisement pages show, competition will not be removed by the fusion; and those who have been instrumental in bringing it about are too keen business men not to know that their own personal interests will be heavily jeopardized if they cannot with time show to the industry justification for the course that is being pursued. Tangible results, however, must, we repeat, lie ahead, and not be immediately expected. In the interests of the gas industry, and of the firms themselves, we hope there will be full realization of anticipation.

Gas-Workers' Hours.

This question is still in suspension. According to a letter which it is understood Mr. Will Thorne recently addressed to the District Secretaries of the National Union of General Workers, the position is that, at the last conference, a difference of opinion arose—this difference we believe being among members of the Council of the Gas-Workers' Union—owing to the fact that the employers had offered a 48-hour week to apply to all sections of the workers. The National Federation of General Workers are still maintaining the position that a 44-hour week should be adopted; but we have not any explanation from them as to how this would harmonize with the three-shift system. However, Mr. Thorne's letter indicates that the various districts have been approached to ascertain whether they are in favour of a compromise between the 48-hour week and the 44-hour one. This is the last news to hand. Whether it has yet advanced beyond this stage, we do not know.

Gas Industry's Case before the Coal Commission.

The Coal Commission had some solid facts put before them yesterday week, on behalf of the gas industry, by Mr. D. Milne Watson, the President of the National Gas Council. A year's bill for coal increased by £10,500,000 at the pithead, which has had to be met by the customers of the undertakings and the loss of part of the already modest dividend of the stockholders, is something over which the Commission—particularly the miners' representatives—may ponder, seeing that the gas industry stands for so much to the poorer section of the community in supplying it with light and heat on what were, before the crushing blow came from the price of coal, reasonable terms. Considering the price of coal the terms are not unreasonable now; but they are not what the gas industry desire them to be. The same remarks apply to the supply of gas to other sections of the community and for industrial purposes. Mr. Milne Watson also showed the Commission (as the extended report in other columns discloses) what excellent use the industry makes of the coal supplied to it—in fact, it places at the disposal of the country more of the potential energy of the coal in various forms than is done by any other user of coal on the large scale. Yet the industry has been subjected to more restraint and difficulty through Government channels than any other in the country. The facts were all presented; and they could not be disputed. For the gas industry coal control during the war has not been an unalloyed success. It has no doubt done something to keep down prices under war conditions; it has also done something to put them higher than they should have been. Experience has not made unity of control over the whole of the coal market and the transport of coal an acceptable thing; and Mr. Milne Watson gave his preference under normal conditions to open competition. So far as the supply of coal to gas undertakings is concerned, those with coal to sell may be keen to get the business, but collective action in regard to prices considerably undermines the fruits of competition so far as buyers are concerned.

Nationalization.

The coal miners are proposing to create a new heaven and a new earth for themselves; and simultaneously the country generally is to benefit. Everything is to be made right. The oppression of the coal owners is to go; the Government, who during the war have been indulging in a bit of profiteering through coal which does not belong to them, are to enter into possession, with the difference that the coal industry, having become State property, is to be run by a Council of Ten under a Minister of Mines. Five of these members (two of whom shall represent the consumers) are to be appointed by the Minister, five by the Miners' Federation. Though there is to be State possession, the miners are to have equality in decision over all that is to be done. Their presence on the Council, we are asked to accept, will guard the interests of the community, and (we can well believe) of the miners themselves. This is the scheme outlined before the Coal Commission, on behalf of the miners, by Mr. W. Straker. The miners, too, claim a share in the direct management of the pits by the formation of pit committees. They have no objection to the present owners being paid a fair selling value for their property, so long as they are cleared-out, and the working of the collieries is for the benefit of the community, instead of the profit of a few people. The figures that have been placed before the Commission show that very large average profits have been made during the war by the collieries and the Government, at the expense of the users of coal.

Is There a Better Way?

The community will want to know whether there will be better protection under the proposed new order of things than under the old, or whether there is not a better way than the old, and a better than the proposed one. Professor Henry Louis has testified that Germany is the only example of State ownership of mines; and the example has produced results which are forbidding to any such transfer of ownership in this country. On the other hand, Sir Richard Redmayne (while not expressing any definite opinion as to the propriety of State ownership) is persuaded that the present system of individual ownership of collieries is extravagant and wasteful; and that a considerable part of the expense borne by the community is due to the complicated distribution machinery which exists, and which at every fresh break in the line of direct supply means added profit for someone. He is rather in favour of collective working. With limitation of profits, which (for all industry) is rising to the surface of national policy, it ought to be possible to institute for the coal industry some better system than the present one. The relation of the coal industry to the country's industries and general weal places it on a different plane from that of other industries. Were this not so, and the miners' argument as put before the Coal Commission were taken alone, it might well be asked, why benefit should not result from the nationalization of all industries? We do not believe in nationalization, and not only for the reason that the State is totally unfitted to manage producing and trading interests, but because of the deterrent effect such action would have upon individual enterprise, upon which the progress of any country so largely depends. While we are talking, America is settling-down upon a large coal export trade, from which as things are it will be difficult to dislodge it.

Seductive Government Advertisements.

In their money-raising advertisements, the Government sink to methods that are not altogether dignified. They utilize comparison with unfortunate enterprises, one at least of which they have helped to make so. Not long since, we called attention to a War Bond advertisement, which pointed out that no one in these times could be contented with a 3 p.ct. dividend—a dividend to which Parliament has in these days condemned a large part of gas capital, as though it was a security far transcending anything the British Government could themselves offer. For their own part, the Government offer 5 p.ct. One of the latest War Bond advertisements reads: "There is no 'passing of dividends;' no reduction of interest when trade falls off. Changes in industrial conditions may cut-down the returns from other investments; they do not affect either the yield from War Bonds or the ultimate increase in capital value. That is one of the considerations carrying weight with those responsible for the investment of trust funds and company reserves." Holders of gas stock read these advertisements under a cloud of gross injustice.

BRITISH ASSOCIATION FUEL-ECONOMY COMMITTEE.

The above-named Committee—originally appointed in 1915, and whose first report was issued in 1916—has, owing to the urgency and the importance of the coal situation and fuel economy in connection with reconstruction problems, been re-appointed to continue its investigations upon the various economic, scientific, and technical issues connected with the production and utilization of coal and other fuels.

Prof. W. A. Bone, F.R.S., has been re-appointed Chairman, with Mr. H. James Yates as Vice-Chairman, and Mr. Robert L. Mond as Secretary. The General Committee of thirty-three members includes representatives of the Association of British Chemical Manufacturers, the Coke-Oven Managers' Association, Federation of British Industries, Institution of Electrical Engineers, Institution of Gas Engineers, Institution of Mechanical Engineers, Institution of Mining and Metallurgy, Institution of Mining Engineers, Iron and Steel Institute, Society of British Gas Industries, and Society of Chemical Industry. It is divided into three Sub-Committees: (A) Chemical, General, and Statistical, presided over by Prof. Henry Louis, with Prof. W. W. Watts as Vice-Chairman; (B) Carbonization and Metallurgical, presided over by Sir Robert Hadfield, Bart., F.R.S., with Mr. Alfred Hutchinson as Vice-Chairman; and (C) Power, presided over by Mr. C. H. Wordingham, with Mr. W. H. Patchell as Vice-Chairman. The Executive Committee—which consists of Sir Robert Hadfield, Sir Joseph Walton, M.P., Professors Bone H. Louis, and W. W. Watts, Dr. H. S. Hele-Shaw, Messrs. A. Hutchinson, R. Mond, W. H. Patchell, Henry Woodall, C. H. Wordingham, and H. James Yates—meets in London on the second Wednesday in each month. The Committee is now compiling data and information concerning a number of subjects of public interest, including *inter alia* such questions as: (1) The economic aspects of coal production in Great Britain; (2) low-temperature distillation of coal; (3) future standards for public gas supplies; and (4) the proposed electric power scheme, &c. They invite individuals, firms, or institutions possessing information of value to place it at the disposal of the Committee.

All communications should be addressed to Prof. W. A. Bone, F.R.S., at the Imperial College of Science and Technology, South Kensington.

CHARGING FOR GAS ON A HEAT UNIT BASIS.

A Plan Suggested by Mr. Charles Carpenter, D.Sc.

The flowing tide has not failed to draw into it the Chairman of the South Metropolitan Gas Company (Mr. Charles Carpenter, D.Sc.) At one time, we should not have expected any admission from him that water gas should be supplied in any form or quantity, or that calorific power should, under any circumstances or in any place, be brought below the relatively high standard provided by the Company. No man is infallible; and every man has a right to revise his views with changing circumstances. In his address to the proprietors of the South Metropolitan Gas Company a few weeks ago [see "Journal," Feb. 18, p. 332], speaking of the quality of gas, Mr. Carpenter plainly indicated that former views were relaxing to the pull exerted by current circumstances. He then said: "While it may be economical in one district to convert a large proportion of the residual coke into gas, in another it may be better to use nothing but coal for the production of the heat units required." Economy, therefore, is the dominating factor in determining the character of the gas to be supplied. So far so good. In the same connection, and on the same occasion, he referred to the variations in the composition of gas now supplied, which variations are opposed to the consumer knowing what he is buying when his only direct information is the volume of gas charged to him, as measured by his meter. Then came in the same address the suggestion that Parliament must prescribe a new basis of gas charge—one based on heat, instead of volume. The consumer, remarked Mr. Carpenter, would then know what heat energy he is paying for. He would buy so many heat units, instead of so many cubic feet of gas.

An Old Idea but an Original Method.

The idea of charging for gas on a heat energy basis is not new. Lord Moulton, in his Presidential Address to the Institution of Gas Engineers last June (speaking of the adoption of a general calorific power standard), said this would put gas and its great rival electricity on an even footing in one important respect. "Each would be paid in proportion to the amount of energy supplied to the consumer—in the one case in the form of thermal units, and in the other case in the form of electrical units." Many men have suggested that, as the gas industry's prime commodity is now used, with the shadow of an exception, for heating purposes, some method of charging on the heat basis would be an advantage. While therefore the idea is not original, Mr. Carpenter has now gone beyond that stage, and has explained, in our contemporary the "Gas World," the method he suggests should be adopted of charging on the heat basis.

Rumour has been busy as to the probable contents of the report which the Fuel Research Board has made, or is about to make, to the Board of Trade; and if all that is said turns out to be true, the gas industry will find itself called upon to deal with an entirely new situation. But until the contents of the final report are definitely known, it is preferable not to say too much on the strength of rumour, though rumour be based on a preliminary indication as to the probable lines of the report. However, it is the possible impending change that has induced the proposal by Mr. Carpenter, which may be briefly indicated.

Sale per 100,000 B.Th.U.

The electrician sells energy; and Mr. Carpenter holds that we must do the same. When this basis of working is adopted, individual undertakings should be left to decide for themselves the "strength" of the gas they can best supply, making their charge for heat units. "This would meet the conditions requisite in the case of a works in the position to supply pure coal gas of (say) 600 B.Th.U., and equally of another works which, with a poor market for coke, found it advantageous to add large proportions of water gas, and making a 450 B.Th.U. or even lower value mixture." Here again we see that economy and local conditions appeal to Mr. Carpenter in these days as determining factors in the calorific power of the gas to be supplied. He suggests that, owing to the great superiority of gas over electricity from the economic standpoint, it will be desirable to take a unit of much higher value. A convenient figure, in his opinion, would be 100,000 B.Th.U., which would be approximately thirty times as great as the electrical unit—3420 B.Th.U. For instance, 1000 c.ft. of 500 B.Th.U. gas give on combustion 500,000 B.Th.U. If this were sold at 6d. per standard unit—100,000 B.Th.U.—electric energy would have to be sold at 0·2d. per Board of Trade unit to compete on an equal basis for heating purposes. Thirty units of electricity × 3420 B.Th.U. = 102,600 B.Th.U.—say 100,000; and 0·2d. per unit × 30 = 6d. The following explanation is given:

> The consumer's meter card would record indexes and consumption in hundreds of cubic feet as now, but would have in addition a factor (to be changed, of course, when the price is altered), and which would be a multiple by which the consumer could convert his consumption in cubic feet into standard gas units. The advantage of taking this standard at 100,000 B.Th.U. is apparent, for the multiple factor would be the figure for the calorific value of the gas supplied. If the index is read in hundreds of feet, shifting the decimal point three places to the left after multiplying by the factor gives the result in standard gas units. For instance, 2000 c.ft. of 450 B.Th.U. gas equals 9 units and so on. [In practice, the cyphers would be omitted from the factors, as they are with the present mode of charge.] Of course, the accounts rendered to the consumer would be for so many units equal to a charge of so much money.

Advantages Outweigh Disadvantages.

In his address to the proprietors of the South Metropolitan Company, the Chairman mentioned a point of considerable importance when he said: "It would be necessary at the same time to devise machinery by which the consumer would be assured of getting the units he pays for." There's the rub. The consumer would have to rely upon the official tests made by the local authority, or upon—particularly in the case of local authorities supplying gas—the declarations of the gas suppliers. Moreover, official tests disclose minimum, maximum, and average results; and it would have to be the average that would have to be taken. The "machinery" would indeed have to be carefully devised. Still the consumer would be better off under this system of charging, as if the company or local authority was found selling or charging for something which was not of the quality represented, it would be guilty of fraud. However, any difficulty would have to be overcome, to secure the advantages of a change in the basis of charge. There is no gainsaying that there are some advantages. There is "something more definite in buying heat units than in buying cubic feet;" and "it places in our hands a most effective weapon whereby to fight electric energy on a scientific basis." Selling gas on the thermal basis would also induce engineers to extract from the material they use as many B.Th.U. as possible, subject to the conditions of use of the gas. "The test of efficiency would then be B.Th.U. per ton, and not cubic feet." These are advantages, it seems to us, that would outweigh any disadvantages that may be brought to mind. But once a standard has been selected, it would have to be scrupulously observed under local conditions.

The Local Government Board have made an Order for the Bury Corporation substituting a calorific standard of 500 B.Th.U. gross for the illuminating power standard hitherto in use.

The Board of Trade have made a direction, dated the 10th inst., providing that no delivery of coal for export or for use as ships' bunkers shall, without the express consent of the Controller of Coal Mines, be made by or on behalf of the owners of any colliery in pursuance of any contract made prior to Aug. 4, 1914.

The "Neue Freie Presse" announces that a new combine has been founded under the name of the Benzol Combine Company, Ltd., with headquarters at Bochum, in place of the former Benzol Association. Nearly all German and Austrian benzol producers have joined the new organization, which began its selling activities on Jan. 1 last. The crude benzol output of the Moravian-Silesian coke factories amounted before the war to 100,000 metric cwt. per annum. It has doubled since then.

PERSONAL.

Mr. A. Canning Williams, the Treasurer of the Edinburgh and Leith Gas Commissioners, has been elected Chairman of the Scottish Branch of the Institute of Municipal Treasurers and Accountants (Incorporated).

Mr. James Wood, for some time the Manager of the Clones (co. Monaghan) Gas-Works, has been appointed Manager and Secretary to the Monaghan Gas Company, in place of Mr. J. K. Harrison, who has taken up a like appointment at Armagh.

With regard to the paragraph in last week's issue, stating that an important new gas-works scheme is under consideration by the Middle Ward District Committee of Lanarkshire, a friend from Scotland informs us that Mr. W. Doig Gibb has been invited to act as Consulting Engineer to the Committee and to report on the whole scheme *de novo*, and to advise them as to the best methods to pursue.

"The Times" understands that, with the conferring of a peerage upon Sir George Askwith, the post of Chief Industrial Commissioner, which he has filled since 1911, will be abolished. His staff will form the nucleus of a new Conciliation Department to be established in the Ministry of Labour; and Sir David Shackleton, the Permanent Secretary, will be placed at the head of it. It is probable that Sir David Shackleton will be relieved of some of his present duties, in order to give his chief attention to the settlement of industrial disputes. On becoming a Baron of the United Kingdom, Sir George Askwith is taking the title of Lord Askwith of St. Ives, in the county of Huntingdon.

OBITUARY.

THOMAS CANNING.

The Wales and Monmouthshire District Institution have lost one of their most active supporters, the gas industry generally an enthusiastic worker, and the members of the profession a much valued friend, through the death on Monday of last week, at his residence, Aragon House, Clytha Park, Newport, of Alderman Thomas Canning, the Engineer to the Newport (Mon.) Gas Company. He presided at the first meeting of the Institution, which was held in Cardiff in September, 1905, and on that occasion delivered a well-reasoned and informative Presidential Address, which extended fair promise, afterwards amply fulfilled, that he would prove of great help to his fellow-members through the medium of the Institution.

Mr. Canning was born at Castle Carbury (co. Kildare) in February, 1849, and received a large part of his training at the Royal College of Science, Dublin. At the conclusion of his college course, he joined the gas profession under Mr. Walter Fiddes, at Bristol, and then for some time had control of the Stroud Gas-Works. When, however, he was but 25 years of age, he obtained the appointment of Engineer and Manager at Newport, where the whole of his subsequent life was spent. In addition to the management of a progressive undertaking, he rebuilt the Mill Street works of the Company, and designed and constructed their new works at Crindau. At the end of 1912, he was elected a Director of the Company, while retaining his position as Engineer; and at the same time his son, Mr. J. H. Canning, was appointed Manager of the Crindau Gas-Works and Assistant-Engineer. Another son, Mr. T. F. Canning, is the Engineer and Manager to the Southend Gas Company.

Besides his successful management of the Newport Gas Company, Mr. Canning found time to act as consulting engineer to various gas undertakings; and, of course, he also led an active public life—being an Alderman of the borough of Newport, a Magistrate, and Harbour Commissioner. Educational matters claimed much of his attention. He for many years acted as the Chairman of the Technical Instruction Committee, and one of the Governors of the Intermediate Schools. His words, both written and spoken, gave proof of culture of mind; and his kindliness of manner was an encouragement to all to seek his help whenever required. He was an associate member of the Institution of Civil Engineers, as well as a member of the Institution of Gas Engineers. As a particular instance of his work outside our own industry, may be mentioned the fact that some forty years ago he forcibly drew the attention of the scientific world to the danger of colliery explosions being caused by lightning—his views ultimately finding general acceptance.

THOMAS ORMISTON PATERSON.

On the very same day, the industry had the misfortune to lose another of its old members—one of a family whose name is as well known and as highly respected in the profession as that mentioned in the preceding note. We refer to Mr. Thomas Ormiston Paterson, who died at Westleigh, Montpelier, Weston-super-Mare, on Monday, the 10th inst., at the age of 71 years, after a comparatively short illness.

Mr. Paterson spent a little over one-half of his lifetime in the service of the Birkenhead Corporation. After having been with them for 36 years, he retired in 1916 from the position of Gas Engineer and Manager, and was appointed Consulting Engineer. The occasion was marked by gratifying proof of the good feeling existing between Mr. Paterson and the gas-works staff; and during the presentation, the Chairman of the Gas Committee (Alderman J. H. M'Gaul) paid high tribute to the excellent work done by him over his long period of service. He was born in Berwick-on-Tweed, and was a son of the late Mr. James Paterson, of Warrington, and after serving his articles was with his father at Warrington while the works there were being reconstructed. Then he spent several years at Rochdale—first as Assistant and afterwards as Chief Engineer. His next move was to Birkenhead.

Mr. Paterson was a member of the Institution of Civil Engineers; and he was elected a member of the Gas Institute in 1874, becoming President in 1901, when the meeting was held in London, and there was discussion of the proposals for amalgamation of the Institute with the Institution of Gas Engineers. Ten years before that he was President of the Manchester District Institution of Gas Engineers.

Mr. Paterson's father was President of the Gas Institute in 1871, and his brother Mr. R. O. Paterson, of Cheltenham, in 1883. Mr. James Paterson has, of course, now succeeded his father Mr. R. O. Paterson as Engineer and General Manager to the Cheltenham Gas Company.

Many readers will learn with much regret that Mr. D. Bryce, who for many years represented the Richmond Gas Stove and Meter Company, Ltd., in Lancashire and Yorkshire (with headquarters in Manchester), died on Tuesday last after a short illness. Mr. Bryce was highly respected, and will be greatly missed among a wide circle in the industry. The funeral took place on Friday at Cheadle Hulme Parish Church, in the presence of many friends and colleagues—testifying to the high esteem in which he was held.

ELECTRICITY SUPPLY MEMORANDA.

The Lag in Industrial Expansion.

In industrial areas, electricity supply undertakings are feeling very acutely the cessation of munition work; and the valleys in the output curve have become very pronounced. This was inevitable; but some electrical engineers in respect of plant requirement have been casting forward as though the flight in demand had come to stay. The war, however, was not going on for ever. Again, many municipal undertakings made their budgets for the current financial year in anticipation that the demand for munitions would continue at any rate well into the spring. But good fortune had it otherwise, and munition making fell off almost as soon as the armistice was signed; so that there are at least four months that have shown a drastic recession, and revenue has suffered heavily in consequence. There was at one time hope that the end of the war would see the country's manufacturers displaying such energy in reconstruction and expansion that the part of the load which munitions production no longer required would be quickly picked-up for peace time work. But the position is nebulous. Finance and materials control is not being shaken off at the rate anticipated. Labour is in a state of ferment; and there is no knowing what the end is going to be. There is the heavy cost of capital; and there is doubt as to relief from the payment of "excess profits." With the muddled conditions and uncertainties that surround them, manufacturers are not disposed to make movements which might involve them in heavier difficulty. Between them, the Government and labour are very effectually preventing industrial development; and therefore contributing to unemployment, and to the maintenance of charges upon the taxpayers for providing unemployed pay for demobilized men. In these circumstances, it cannot be expected that gas and electric power and gas heating for industrial uses will be hastily restored by constructive work in the industries. It is to be greatly deplored.

Loss of Munitions Business Causes Further Increases in Charges.

Those electrical undertakings that have been carrying the heaviest munitions load are the greatest sufferers; for they have nothing much upon which to work to produce an equilibrium in output. The gas undertakings that were strained by demand for munitions purposes had simultaneously to beg their domestic consumers to ease their consumption as much as possible. They are reaping the benefit now. Though the Fuel and Lighting Rationing Order is still in operation, domestic consumers in these places are drawing in the total more copiously upon the gas-mains. Their gas appliances are in position; and, in the absence of further appeals for economy for the patriotic purpose of keeping the munition works going, and with the weather offering temptations to the enjoyment of more warmth, the domestic demand has done something to compensate for the consumption losses for munitions work. The diversity of demand upon a gas undertaking is something which is envied by many electrical engineers. However, we were remarking that it is naturally the electricity stations that have had the heaviest demand upon them for energy for munition work which will feel most acutely the changed conditions. There is the Electricity Department of the Manchester Corporation. The estimate for the year ending the 31st inst. is that there will be a financial loss; and this is attributed to the reduction of output and income since the armistice, the inevitable time-lag in passing on burdens to the consumers, the effect of the Rationing Order,

and the increase of wages in November. The Chief Engineer and Manager (Mr. S. L. Pearce) hopes that trade will soon revive; but the present industrial unrest is having a retarding action. Not only this, but there are the other causes we have mentioned in the preceding paragraph. He is forced to recommend a further raising of the war charges; and these are his proposals: That lighting charges (including domestic power) shall be increased from 40 to 65 p.ct.; industrial power, from 50 to 85 p.ct.; and special large power consumers governed by contracts containing sliding-scale coal clauses, from 20 to 30 p.ct. Where additional percentage advances have to be made through the loss of the demand of munitions works, this will make it more difficult to fill-up the valleys in the output curve occasioned by the stopping of the munitions factories. But the increases are imperative in order to establish financial stability. They do not end at the charges for energy. There is to be an all-round increase in the charges for motors hired by consumers of about 25 p.ct., together with an increase of 25 p.ct. in the initial charges for the delivery and fixing of the motors.

Enhanced Costs of Consumers' Apparatus.

These increases in the hire-charge for motors raise other reflections. They are not enough for new motors. In the engineering trades, it is calculated that roughly the costs of production have gone up by 100 p.ct., and in some lines considerably more. Therefore, if a given figure was sufficient for the hire of a motor or other piece of apparatus formerly, 25 p.ct. increase will not be sufficient to cover the additional costs of new motors and their installation. Men in the electrical industry who are not manufacturers of electrical appliances are agitating for those who are to provide them with electric equipment for domestic purposes which shall have closer approximation in cost to gas equipment. How can they do this when costs have ascended as they have done? Strong domestic electrical appliances are bound to be, from their very nature, much heavier in cost than gas appliances of equal capacity and strength; and 100 p.ct. increase in costs of production therefore means more to them than to gas appliances. Apart from running costs and the value given to the consumer in effective work for a given sum, the increase in first and installation costs must have a retarding effect on new business. The Electrical Development Association starts its work with a handicap from which there is no escape. Many electric undertakings have, during the past few months, had heating appliances returned to them. This is put down to the Rationing Order; but be it remembered that 800 units were allowed by the Coal Controller as the equivalent of a ton of coal and 1000 units is the present allowance. We are not, under these circumstances, prepared to blame the Rationing Order so much as high cost in relation to effective heat performance. The other day, Lord Downham told the shareholders of the Westminster Electric Supply Corporation that the Order restricting the supply of energy for electric heating and lighting had had a serious effect on the result of the past year's working. "Just as they had succeeded in inducing a large number of customers to adopt electric heating, the appliances hired-out to them were returned, owing to what practically amounted to a prohibition of their use." How prohibition, when 800 units and now 1000 units are allowed as the equivalent of a ton of coal? The prohibition, so far as we have been able to gather from quondam users of electric heaters who have given preference to gas-fires, comes from excessive cost.

As Others See Us, but not Themselves.

Let not, therefore, "Electrical Industries" deceive itself. It should not omit to measure the conditions of the electricity industry while making light of the conditions of the gas industry, without acknowledgment of its commercial actualities and its potentialities. It is a vain exercise to chase the shadows and ignore the substance. Because Mr. H. E. Jones in an extempore speech at the National Gas Council chose to refer to the great possibilities of gas in the fuel market, the electrical writer rashly jumps to the conclusion that the positions supplied by high-pressure gas-lighting and gas-engines have been virtually abandoned by the gas industry. One does not need to search very far for the narrow limits of mediocre perceptivity. However, our contemporary notes the weakening of the old arrogance with which the gas industry treated its chief rival. Gas is now also "on the defensive," and is relying partly on the general argument for coal conservation, and partly on the availability of gas and the cheapness of gas cooking and heating appliances. What is wrong with the argument and the realities of gas relative to electricity? As to arrogance, it was, mixed with a plentiful supply of mendacity, rather a prominent feature at one time of the rivalry of electricity with gas. It has considerably toned-down of recent years. Our contemporary does not think that as a selling point coal conservation is very effective; and consumers will adopt what they find most economical and convenient. We agree; hence our confidence. As to gas being on the defensive, it happens at the time that it is—not directly in respect of commercial matters, but against undue preferential treatment being meted-out to electricity to the disadvantage of a competing industry. It is only a fair field and no favour that the gas industry asks for. At the same time, it is taking the offensive. The electricity industry knows this. Hence the capital reason for the Electrical Development Association. And "Electrical Industries" which sees the impending break-up of the gas industry finds it "reassuring" that the Association intends to set-up "a technical information department to consider the removal of obstacles to the more general use of electricity for domestic purposes." This must be a work of supererogation, seeing that our contemporary is manifestly of opinion that economy and convenience are on the side of electricity. The war and its lessons ought to have knocked out of people all preference for residence in a fool's paradise. Evidently the war and its lessons have not been successful in accomplishing so much.

State Ownership or Private Enterprise.

The reports of the various Committees that have been presented to various Government Departments have been widely read, and have formed a veritable store from which writers in the Daily Press have drawn, with more or less ability (though not possessing even a rudimentary knowledge of the subject), a supply of material for popular articles. The gas industry has had no such advantage; yet, in respect of fuel and other valuable products of coal, it can do infinitely more than the electricity industry in serving the public. It has been a cheap and effective advertisement for electricity. We have come across these articles in almost every paper picked up. The "Observer" has published an article by a "Labour Correspondent" on "Electricity and the Future: State or Private Ownership." He tells of the wonderful things electricity can do for industry and in the home; and, if we mistake not, the report of the Power Sub-Committee of the Coal Conservation Committee has in this particular been his counsellor, though not in giving his judgment in preferring State ownership to private enterprise. He is whole-hearted for nationalization; and measuring the public by his own bushel, he believes there is a general feeling favourable to such a "monopoly" as electricity being publicly owned. Now what has the State ever done in connection with the control of industries to warrant the assumption that it can do better than private enterprise? It has been trying to manage the coal industry; and the revelations before the Coal Commission show that things have been muddled-up, and the consumer has had to pay an unreasonable sum, while the Treasury has been pocketing the surplus proceeds. The "Labour Correspondent" abandons economic prudence in favour of satisfying his ill-formed doctrines. He wants to see electricity supplied all over the country at a common price, which is absurd, unless commercial principles are to be turned topsy-turvy. But, in his opinion, if electric power supply passes into the hands of private enterprise, it may be safely supposed that the most paying districts would be first developed. And a very sensible thing to do. What could be a more natural, and therefore sane, order of things, so as to avoid financial disaster? He fears privately owned enterprise would not care to contemplate the large capital expenditure for the small amount of power required in agricultural districts—at the same time admitting that a lengthy period must elapse before proper development can take place. The remarkable electrical provision that this "Labour Correspondent" contemplates is going to cost money. Who is going to pay? The money can only be gathered from two sources—the consumers in the "paying" part of the country, or the taxpayers. Why, pray, should the taxpayers help to pay the running costs of our manufacturers? A large number of taxpayers will prefer other forms of energy; and because they exercise their freedom of choice, or find other agents more suitable to their needs, are they to be compelled by the State to contribute to the operating costs of other people's factories? The financial aspect of the matter must not be lost sight of in running after a goal which experts in these matters know to be well out of reach. And labour and other newspaper writers should not lose their heads.

Société Technique du Gaz.

In reference to the congress which, as already announced, is to held at Metz in the early part of July next, the Société Technique du Gaz has issued a notice to the effect that, owing to the want of railway communication and of accommodation in Metz, it will be impossible to open the congress to members of the gas industry in the allied countries. The Société Technique very greatly regrets the deprivation which is thus imposed upon it by the circumstances of the time, and proposes to arrange a special meeting of gas men of the allied countries in Paris during the autumn of the present year. Further particulars of this meeting will be sent to Gas Associations in this and other countries, and will be announced in the Technical Journals.

National Sulphuric Acid Association.—A representative meeting in London of sulphuric acid manufacturers has adopted the draft Memorandum and Articles of Association of the National Sulphuric Acid Association as prepared by the Organizing Committee. This Committee were authorized to proceed to registration under the Limited Liability Acts. The Committee were thanked for the work they had done.

Hotel Accommodation for the Meeting of the Institution of Gas Engineers.—Mr. Walter T. Dunn writes: I am desired by the President to ask the favour of space in your columns to remind members of the necessity of booking their hotels well in advance. Otherwise there is likely to be a difficulty in securing accommodation at the time of the meeting, which, as already announced, is to be held in London on May 27, 28, and 29.

SOUTHERN DISTRICT ASSOCIATION OF GAS ENGINEERS AND MANAGERS.

The Annual Meeting of the Members of the Association was held last Thursday at the Connaught Rooms, Great Queen Street, Kingsway, W.C.

A Luncheon and Some Speeches.

Owing to the difficulties of travelling, arrangements had been made for a luncheon, instead of the annual dinner; and for this the members assembled at 1.15. The President-Elect (Mr. Frank Livesey, of Maidstone) was in the chair; and near him was the Chairman of the Maidstone Gas Company (Mr. George Marsham), and two of his directorial colleagues—Mr. Edward Hills and Mr. Frederick Laurence. The Secretary of the Company (Mr. F. A. Gulland) was also there. The President of the Institution (Mr. Samuel Glover) was present; and welcome was given to Lieut.-Colonel Woodall on his return from military service in India. The Hon. Secretary of the Association (Mr. H. C. Head, of Winchester) was active in looking after the comfort of the members.

After lunch, and the honouring of the loyal toast,

Lieut.-Colonel Woodall (who was heartily received) said he had been asked to propose the toast of "The Visitors." He said that he was not yet out of the Army; and he felt that day much more like a visitor than a member. He found it very difficult indeed to appreciate that he once filled the distinguished position occupied by their President that day. He was sure every gas engineer would agree that one thing that made life worth living was the interest taken by his board of directors both in his work and in himself. Their President was most fortunate in the excellent relations that existed between him and his Directors, and in the great kindness which he invariably received from them. This had been expressed by them that day in the most noticeable way, by their being kind enough to come to London to support the President. He (Lieut.-Colonel Woodall) had not the privilege of knowing Mr. Livesey's Directors; but he did know that one of them was father of Commander Laurence who did such extraordinarily brilliant service as a submarine commander in Russian waters. While congratulating Mr. Livesey on the happy relations which existed between himself and his Directors, they could not help saying how much they also congratulated the Directors on having the services of so brilliant, capable, and helpful an Engineer and Manager as their President. He associated the toast with the Technical Press, to which they were all under great obligation. It was well known that the gas industry had been better served by its Technical Press than any other industry of a similar character had been served by theirs. He was sure that the brilliant work that had been done for them in the Technical Press would continue to be done in the future.

Mr. George Marsham (Chairman of the Maidstone Gas Company), in reply, said he did not come there that day to speak. But after the very kind way in which Colonel Woodall had spoken of the Directors of the Maidstone Gas Company, it gave him an opportunity of thanking the Association for their hospitality, and of saying how pleased his colleagues and himself were to be there. Directors were not always able to be on the works as often as they could wish. There was perhaps a reason for this; and it was a matter upon which he, during about forty years of public life, had held a very strong opinion. It was that they as amateurs (so to speak) were bound to take the advice of their experts, and having done this to give them all the support they possibly could. He had no hesitation in saying that he believed, from his experience, he had come to the right conclusion. In electing Mr. Livesey as their President, they had done something which was much appreciated by the Chairman and Directors of the Maidstone Gas Company. He was perfectly sure of this, that the Directors had the greatest confidence that Mr. Livesey would help them through times which they knew were going to be very anxious and very serious ones; and he was quite certain the Association had put the right man in the right place. He (Mr. Marsham) hoped the members would hold their May "outing" at Maidstone, when the President and Directors would have great pleasure in meeting them.

The President, on behalf of the members, tendered their thanks to Mr. Marsham and his colleagues for their kind invitation.

Mr. Edward Hills proposed the toast of the "Southern District Association of Gas Engineers and Managers." He said it gave him great pleasure as a Director to propose the toast, because if the Association had brought advantage to the members, he could also freely acknowledge that it had brought considerable advantage to Directors, and to the undertakings they represented. He understood that, now many years ago, the Association was formed for the mutual help and support of the members. It was then felt that a gas engineer was confined to one locality; that there he was left to work out his own salvation; and that, unless he was brought into contact with other members of the same industry who were also working in the same way, he was likely to become rusty and out-of-date. Therefore the Association must be conducive to the efficiency of gas engineers; and this was to the advantage of the industry. He felt somewhat diffident in touching upon any matters connected with the industry in such a meeting of experts. But he read his "Gas Journal" every week; and he could not help seeing that there had been very great problems for the industry to deal with during the last four years. At the present time, there were great general problems; and there were also great local problems, which had to be solved. Each locality had its own difficulties and problems; and he thought that these problems brought out the individuality and the abilities of the engineers in the districts. In spite of this, in spite of all the personal energy and ability, it must be to the advantage of the engineers that they should from time to time have the opportunity of meeting with their *confrères* to exchange views and to obtain mutual advice and help. As a Director, he could speak of his friend Mr. Livesey. They had a very high regard for him. They had the feeling that he was an excellent man; and that he had the energy, experience, and ability necessary for him to carry through in their own locality. The Association had done wisely in electing him as their President.

The President, replying to the toast, said he felt himself placed in a very responsible position. In proposing the toast, Mr. Hills had explained very clearly, and had shown that he himself thoroughly realized, the purpose for which the Association was formed and carried on. He could assure him that these Associations were not formed for the simple purpose of junketting, and that they had performed a most useful purpose during the years of existence, and especially during the last few years. One thing gave him a great deal of satisfaction that day. It was that three of his Directors were present. The members all felt that they had done their very best to obtain justice for the industry. They represented a vast body of shareholders throughout the country, many of whom were the widow and orphan whom Rudyard Kipling said "prayed for 10 p.ct." They might have prayed for it, but they were not getting it—at any rate from the gas industry. It was a great task that lay before them to obtain justice for the industry. In this, they could not be successful unless they had the hard work and thorough support of their Directors—the men of weight and money in the industry. It was therefore a great source of gratification to him that morning to have the Chairman and Directors of his own Company present to show the members of the Association that they took great interest in the problems that confronted them all. The time before them was going to be a strenuous one; and he hoped that his year of office would be a successful one for the Association. Relying upon the support of the members, he believed it would be so. They were grateful to Mr. Hills for the way he proposed the toast; and he might say that they would all try in the coming year to improve the position of those who had invested money in the industry.

THE BUSINESS MEETING.

The Business Meeting was subsequently held. At the commencement, the retiring President (Mr. W. B. Farquhar, of Ilford) occupied the chair. In opening the proceedings, he expressed his thanks and appreciation at seeing such a large number of members present.

Minutes of the Last Meeting.

Upon the suggestion of the President, the minutes of the last meeting, composed of the report appearing in the "Journal," were taken as read and confirmed.

Report of the Committee.

Proposed by the President, and seconded by Mr. Samuel Glover, the annual report of the Committee was taken as read and passed.

The report in the main reviewed the work of the year. Among other paragraphs were these:

Following the large addition during 1917, the membership of the Association was further augmented in the past year by seventeen new members.

The Committee have to record with deep regret the death of the following members during the last year: Mr. F. W. Rapkin, of Dartford; Mr. P. P. Channon, of Haywards Heath; Mr. Thomas Berridge, of Leamington Priors; and Mr. Thomas May, of Richmond. There have also been two resignations from membership.

The financial position is satisfactory, considering the increase in all costs, and that the subscription has not been raised. The subscriptions received in respect of the year amount to £121 5s. 6d., while the liabilities for the same period amount to £127 5s. 9d. But the funds in hand were sufficient to meet the excess, and leave the sum of £39 9s. 8d. to be carried forward. The expenses of the Association have been greater than usual owing to the additional meetings, and also to the increased cost of the "Reports of Gas Associations," a copy of which is supplied to every member.

The Association has experienced a year of gratifying progress. The problems which now face the gas industry, and the nation as a whole, are even greater than those which have presented themselves during the war; and in order that these may be successfully overcome, the best intellects and the most strenuous efforts must be concentrated upon them. A time of great difficulty is a time of great opportunity; and the gas industry will find both in the pregnant days confronting us. Perhaps the most ominous signs are those to be observed in the labour world. But differences, as they arise, must be met in a spirit of firmness, goodwill, and confidence, and settled justly, with a view to producing a state of comparative permanence in place of the present unstable conditions.

New Members.

On the motion of the President, seconded by Mr. A. Caddick, the following candidates for membership were elected: Mr. F. Leonard Ball, of the Mid-Kent Gas Light and Coke Company, Mr. E. G. Hutchinson, of Richmond, Mr. H. W. Versey, of Dawlish, Mr. R. B. Silcox, of Ivybridge, and Mr. H. A. Hunt, of Crediton.

Induction of the New President.

The President said it gave him great pleasure in introducing the new President, Mr. Frank Livesey. It was quite unnecessary for him to say anything as to his abilities. He was well known to all the members; and he bore an honoured name. He represented a Company

which was progressive, and one of the foremost in the particular part of the country in which the undertaking was situated. He was sure they would have in Mr. Livesey one who would be worthy of the presidency. He (Mr. Farquhar) regretted having to leave the chair, because it had been a great pleasure to him. He only hoped that what he had done in his own small way would have borne some little good. Mr. Livesey would, he was quite certain, maintain the record of the Past-Presidents.

Mr. Livesey took the chair amid the applause of the members.

The President thanked the members very heartily for their reception of him on taking the chair. The first duty which fell to his lot was a pleasant one, and one which he felt he could undertake with the greatest sincerity. It was to propose a very hearty vote of thanks to their immediate Past-President for the valuable service he had rendered to the Association during the past year. "Presidents come, and Presidents go." But if the Association was to go on for ever, it would be necessary for them to find for the position men like Mr. Farquhar, who, at a time of great stress, was willing to take on the additional work of President of the Association, and to preside over their deliberations. The engineer of a busy, growing, important suburban undertaking, and engrossed with confronting, and successfully overcoming, the difficulties with which he in common with them all had been faced during the immediate past years, he had yet found time to serve the Association, and to provide suitable mental fare for the delectation of the members, as well as to lavish hospitality upon them on their visit to Ilford last summer. He had presided over their deliberations with strength and dignity; and his calm and deliberate opinion on affairs had been of great value to them. He had therefore much pleasure in proposing a vote of thanks to Mr. Farquhar for his services in the chair.

The motion was very heartily carried.

Mr. Farquhar said he hardly felt able to express himself for the kind words with which the President had proposed this vote, and for their hearty endorsement by the members. As the President had truly said, times had been very difficult; but he (Mr. Farquhar) had tried to do his best in the position in which the members had placed him. The meetings which one had had to attend during the year absorbed a certain amount of time from work which had to be attended to in other directions. Still the work of the Association was important; and he hoped that the year had added something to the records of the Association.

Representative on the Council of the Institution.

Mr. D. H. Helps (Reading) proposed and Mr. L. J. Langford (Tunbridge Wells) seconded, a proposal that the President should represent the Association on the Council of the Institution of Gas Engineers.

Mr. Samuel Glover (President of the Institution) observed that the Council would heartily welcome Mr. Livesey to their deliberations.

The President, in his acknowledgment, said the work which would be entailed would be done by him with the greatest pleasure, and to the best of his ability.

The President then delivered the following

INAUGURAL ADDRESS.

Allow me at the outset to thank you heartily for the honour you have shown me in electing me your President. A considerable responsibility is attached to the position; and I therefore ask your support in order that the coming year may be a fruitful one for our Association, as we trust it will be for the gas industry in general.

THE END OF HOSTILITIES.

In addressing you to-day at a time when, after four years of the most-fiercely contested war the world has ever known, the long hoped-for victory has been achieved, I must first pay my tribute to the glorious British Armies, whose heroism has forced our enemies to complete surrender. The co-operation of the armies and navies of the Allies, supported by the brains and power of our engineers and leaders of industry, and by the will of the mass of the people, has secured this keenly-desired result; but those who have borne the brunt of all the dangers, hardships, and discomforts have been the junior officers and men of our glorious infantry battalions. To them, the country can never be sufficiently grateful. Eight members of this Association joined the forces, and two have laid down their lives. I am sure all of us read with the deepest regret of the death in Asia Minor of Major D. F. Colson, who rendered distinguished service to his country in the South African as well as in the late war. Of necessity, our Roll of Honour is a small one. The nature of our work and the services which we have been able to render to the country have prevented many from joining the forces.

CARRYING-ON AT HOME.

In a humble, and yet strenuous, sphere of duty we have all been called upon to exert ourselves to the utmost in the National interest; and it was gratifying to us to read, in the speech of His Majesty King George, made in November last to the Houses of Parliament, the reference to those who carried-on at home. The work has been exacting and difficult. Simply from the point of view of carrying on our industry we have been handicapped by the fact that the wear and tear on our plant is very heavy, the materials handled, whether solid, gaseous, or liquid, being of such a nature as to cause abrasion and corrosion, and, in consequence, the spare parts required in iron and steel are numerous and heavy. Cast steel has been almost unprocurable, and malleable castings have been used as substitutes—in many cases with unpleasant results.

COAL DIFFICULTIES OF SOUTHERN GAS-WORKS.

The control of our coal supplies has caused difficulties. Many have had frequently to change at short notice from one class of coal to another. Yorkshire, Derbyshire, Durham, household coal, hard steam, nuts, and slack have succeeded one another at short notice. Under these conditions, as each class of coal requires its own method of carbonizing—both as regard weight and period of charge—it has been difficult to maintain the production of gas at our usual figures. Armistice Day did not bring to us any return to easier conditions. Shortage of coal and labour and our other staples has never been so acutely felt before. There is no group of gas undertakings that has suffered more severely from the difficulties and expenses of the war than the companies in the South of England who depended on seaborne coal. Increase in the cost of freight took place before increases in pit-head prices of coal were authorized, with the result that gas prices in the South had soon to be raised. At the present moment seaborne coal is bearing an advance of 15s. 2d. per ton, in addition to the pit-head advance which is common to all. It is some consolation to reflect that this item of freight is one which we can be sure will soon be substantially reduced; for the world has now entered upon such a programme of shipbuilding as will in a few years completely re-establish the pre-war tonnage available. The future of coal prices depends largely upon what is the maximum which the other European nations are prepared to pay for it, as the English producers and miners have showed their intention to force the price as high as possible.

COAL PRICE PROSPECTS.

After all the great wars, coal prices have been high. Thus, after the Franco-Prussian War, prices continued to rise. The f.o.b. quotations for Durham coal were as follows: July, 1871, 18s. 3d.; July, 1872, 27s. 6d.; July, 1873, 35s. After this date they soon fell to the normal. There were at that time probably pessimists who declared that the price of coal would never fall again. The leaders of Labour seem now determined to force-up the price as high as possible. This is admittedly a serious matter, as the following figures, published recently by the Secretary of the Monmouth and South Wales Coalowners' Association, show:

Year.	Cost of Labour, Per Ton.	Cost of Stores, Per Ton.	Labour, *plus* Stores, Per Ton.
1887	4s. 4·18d.	1s. 7·59d.	5s. 11·77d.
1897	5 5·88	1 10·95	7 4·83
1914	11 8·46	3 8·24	15 4·70
1918	26 2·92	8 10·24	35 1·16

The item stores includes stores, horse keep, boiler coal, pit wood, rates and taxes, and general charges, but not depreciation.

There is seldom a difficulty without some solution, and at the present moment the Trade Union leaders appear to be alive to the dangers of excessive wages demands, although, incidentally, they continue to make them with great regularity. Mr. Appleton has recently said: "If the miners increase the cost of fuel and the railwaymen the cost of transport, they limit the market where their fellow workers sell their goods, and ultimately, owing to the operation of the law of diminishing returns, decrease the value of their own labour." We all most earnestly hope that sanity will prevail before such harm has been done to the trade of the United Kingdom as will take a generation to heal. The Price of Coal Limitation Act, as it now stands, will not expire much before the end of the year—indeed, it would be undesirable that it should do so before some part of the arrears of coal required by the industries of the country had been made up. To allow all coal consumers to enter into active competition for the coal which will be available this year would cause such a rise in the price of coal, and consequently in miners' wages, as might have a serious effect on the permanent prosperity of the country.

HANDLING COAL AT MAIDSTONE.

The Maidstone Gas Company, ever since its formation in 1823, has been dependent on seaborne coal supplies. The works are situated on the west bank of the River Medway, with a river frontage of 980 ft., and were designed for the handling of coal by water only. The three coal-stores and two retort-houses all run longitudinally from the river. In pre-war days, our coal was discharged from ship at Rochester and brought up the Medway in lighters of from 100 to 150 tons capacity. The coal is unloaded from these lighters by a 5-ton travelling steam crane and a one-ton Priestman grab. Hoisting is done by a chain; and the discharging mechanism, which will operate at any height, consists of a steel wire to take the weight of the grab when opening, connected to a drum fitted with a band brake—the slack in the wire being taken-up by a steel spring, 2 ft. 3 in. in diameter. The crane delivers through different shoots into one-ton roller-bearing trucks. The coal is weighed and run into the coal stores, which have a total capacity of 4000 tons. I greatly prefer this kind of discharging plant to the bucket elevator type, being generally more adaptable and capable of dealing with all kinds of coal—hard or soft, rough or small.

The intermittent weighing on the ordinary type of weighbridge is certainly more satisfactory than any continuous method of weighing. Moreover, a crane and grab can work at any height of tide, can load and trim coke, dredge the river, and be put to other

uses. The prime cost and cost of repairs compare favourably with other types of plant.

The capital cost of this plant was £827 19s. 4d.
The working costs were 1¾d. per ton before 1914, and at the time of writing are 3d. per ton.
The total cost of repairs has been—

	£ s. d.
Labour	145 12 11
Materials	43 18 9
	£189 11 8

The coal handled to Dec. 31 has been 177,706 tons; so that the costs are as follows:

Cost of unloading coal into store—

	d.
Labour	3·00
Repairs and maintenance	0·26
Interest at 6 p.ct.	0·46
	3·72

When putting down this plant, I searched everywhere for a satisfactory method of weighing the grab and contents while poised for a moment stationary in the air, but was unable to find any system which was strong enough to stand the grabbing strain. There is, however, no reason why these difficulties should not be overcome and a satisfactory machine evolved.

The coal is removed from the stores by a Zimmer conveyor, which delivers it to the coal-breaker, whence it is elevated to a 12-ton storage hopper in the retort-house roof. The Zimmer conveyor at one point turns through an angle of 14° This is done by cutting the tray into two parts, and carrying the drive forward by means of a connecting rod—a simple but perfectly satisfactory arrangement.

It is naturally economical to keep the coal-stores always full of weathered coal, and deliver fresh coal on to the conveyor for use as required. War conditions have, however, prevented this being done. At times it has been necessary to put into stock wet and dangerous coal, with the result that trouble has been experienced with coal fires. The stores were originally covered with a wooden roof, which was destroyed in October, 1917. The new roof, which has only recently been completed, is a 3-in. ferro-concrete slab, 150 ft. by 100 ft., falling from the centre to each end, so that all water is removed by down pipes external to the coal-stores. On the roof are five tramways, leading from the three gantries and hoppers. These tramways are covered with roofs made of curved "Hy-rib," with 2-in. Portland cement rendering. At one end, the building is carried to a second floor, to cover the weighbridge flat; and on top is a 13,000 gallons capacity concrete tank, the water being used for quenching purposes.

During the war, in order to take advantage of the cheaper rail-borne coal, a siding has been made into the works, and the coal is elevated into the western end of the coal-stores and handled in the same manner. At Maidstone, no striking novelties in the carbonizing plant will be found. The retort-house now in use was built in 1892, and has not, therefore, some of the improvements which have been thought-out since then. De Brouwer stoking machinery and coke conveyors are used.

IMPROVED CARBONIZING METHODS—STEAMING AND BLUE WATER GAS.

The war has indeed given a great incentive to invention and improvement in our carbonizing methods. The reduction of the calorific standard required has led to many important methods of increasing the hydrogen and carbon monoxide content of gas. Three processes have arisen: (1) Steaming in vertical retorts, whether continuous or intermittent; (2) steaming in horizontal retorts; and (3) the manufacture of water gas in separate generators. Of the first method, we have had during the last year information from several sources. Substantial increases in the number of British thermal units made available from a ton of coal have been obtained, and the gas evolved has been of satisfactory quality.

The figures recently published of the results obtained at Truro by Settle's downward steaming process have been of great interest to us all. This process has the great advantage of a long and slow travel of the steam, and afterwards of the water gas, through the coke and the partly distilled coal. At the high temperature prevailing in the retorts, in addition to the mechanical blending, chemical regrouping takes place; and this opens-up a great field for research. I am sure the Association would welcome papers on the working of vertical retorts over an extended period, with full details as to the cost of labour, renewals, and the difficulties encountered. More can be learned from papers describing difficulties and disappointments than all the papers written from what I may describe as the salesman's point of view, in which "every goose is a swan."

The second process, producing blue gas in horizontal retorts, is an imperfect one, owing to the insufficient depth of fuel to effect complete dissociation of the steam, even when highly superheated. The maximum travel through the hot coke will probably not exceed 12 in.; and this necessarily allows steam to pass, to be condensed later in the hydraulic mains, with a loss in strength in the liquor produced. This method has, however, proved of value in many small works where the simple apparatus devised by Mr. Rew has given satisfactory results. In one small gas-works with which I am connected, some 15,000 c.ft. of gas per ton has been obtained.

At Maidstone, the carburetted water-gas plant has been used during the war for the manufacture of blue gas. The maximum mixed has been 20 p.ct., as compared with 25 p.ct. of carburetted gas in pre-war days. The dilution of coal gas with water gas has certainly come to stay in works large and small; but its limitations must be recognized. Requiring less air for combustion than coal gas, it is essential that the percentage mixed shall not be allowed wide variations, as it causes nearly all gas-consuming appliances to be found out of adjustment. I say nearly all, because it will be found that, with a well-designed and properly-made bunsen burner, greater variations in the composition and gravity of gas can take place without the great loss of efficiency that occurs with many of the indifferently made appliances which in the past we have been compelled to buy for want of better. My experience is that variation from a mixture of 10 p.ct. to a mixture of 20 p.ct. is a satisfactory limit, and wide enough to allow the daily make of water gas to remain constant, in spite of variations in the make of coal gas owing to different qualities of coal. The point of mixing is at the inlet of the exhausters; but it appears that the sooner the gas is mixed the better. This is an important point; and I hope we shall have during the year particulars and figures from those who have tried earlier mixing points. The passing of the blue gas along a length of foul main alone in contact with hot tar does considerably enrich it.

Blue gas is, unfortunately, far more destructive to steel mains than carburetted gas, owing to the lack of the carbon deposit that forms an insulating and protecting coating. Indeed, it is desirable at intervals of a month to make carburetted water gas for one day; so that the benefit of the carbon coating and the solvent effect of the water-gas tar made is not altogether lost. A curious point, too, is the way in which the powdered fire-brick material in the carburettor and superheater is carried forward with the gas, in spite of considerable scrubbing, and deposited on the vanes of our "Rotary" meter situated on the outlet of the relief holder. Others will have probably experienced this. The separate method of production, of course, is vastly inferior as regards thermal efficiency, owing to the quenching and reheating of the coke used. The addition of blue gas has had the effect of considerably reducing the make of coal gas per ton of coal in most cases. Whereas the tendency before the war was to stretch the make of coal gas as far as possible and enrich with carburetted gas, now the tendency is the other way; and we have to be more careful of the quality of our coal gas, so that it can stand the addition of a diluent.

There are still a great many works that depend entirely upon the jet photometer for quality regulation. A valuable paper could be written on this subject alone. Investigation might be carried out as to the variation of the jet arising from: (1) Air or other inerts; (2) carburetted water gas admixture, blue gas admixture with the corresponding calorific value, and illuminating power tabulated. While being only a rough guide, yet it is very difficult to manufacture bad gas of any kind without our friend the jet photometer detecting it.

PURIFICATION.

At the autumn meeting of the Association we had a most interesting paper on purification, showing the chemical possibilities of the simultaneous removal from gas of sulphur and ammonia. This is a subject which we shall hear more of in the future. New processes of purification when brought to a commercial basis will have a formidable opponent to overcome in oxide purification. Given a good ferric hydrate, the modern-day purifying costs are extremely low, provided a slow transit of gas can be obtained.

LOWER GRADE GAS AND GAS APPLIANCES.

Owing to the spirit of co-operation now prevailing in our industry, and the vigorous initiative of the Council of the Institution of Gas Engineers, we have been able to benefit by the exhaustive tests made with ordinary gas consuming appliances on gases of various qualities and composition. The full investigation is not yet complete; but from the preliminary report, much that is useful has been learned. The Committee have found, as we all expected, that a mixed gas of 500 B.Th.U. is a satisfactory gas for the majority of purposes. While personally opposed to any dilution of gas with air or other inerts, I think that the gas of the future will be lower than 500 B.Th.U. gross. I find that at Maidstone on every occasion prior to the war when the quality of the gas had been reduced, the purchaser has by the operation of a reduction in price been able to obtain greater heating value for his gas than he obtained before. Appliances such as geysers are found to suffer by reduction in quality. Indeed, to obtain really satisfactory results with low-grade gas, their size would have to be enormous; but with the majority of gas-consuming apparatus this disadvantage will not seriously arise.

In the case of a gas-fire with seven burners each consuming 5 c.ft. of 600 B.Th.U. gas per hour, 21,000 B.Th.U. per hour are evolved. To obtain the same heating effect in a fire of the same width, with gas of 450 B.Th.U. quality, 7 c.ft. per hour per burner will be required. This amount of gas can be burnt, and a suitably shaped radiant provided. Slightly more gas would have to be distributed; but this can be done by increase of pressure. I do not think the question of gas storage is important. As the quality of the gas is reduced, so methods of manufacture become more elastic—thus able to meet sudden demands without quite the same storage capacity as is required for straight coal gas.

AN ECONOMY-PRODUCING COOKER.

One striking feature of the report was the low efficiency given by the average kettle. In many cases where a kettle is boiled on

the hot-plate of a gas-cooker, it is a common practice to have bars passing through the flame carrying it. These bars alone cause an additional loss of 15 p.ct. efficiency. About thirty-eight years ago a gentleman connected with the Maidstone Gas Company patented the "Maidstone Regenerator Gas Cooker," which still gives better results than most of the modern cookers I have tested. The principle of this stove is that air is drawn in through the jacket round the oven, and through slots in the side of the cooker into the oven in proximity to the burners. After combustion, the gases are led away from the top of the oven through a baffling device. The advantage of the stove is that no lagging is required, as the stove is air-lagged—any heat passing through the oven side being taken up by the incoming air. Secondly, the amount of air passing through the oven is strictly limited by the size of the slots. The process of cooking requires a high temperature, and therefore to heat any unnecessary excess of air is very wasteful of gas and will probably cause a greater loss of weight in meat cooked than is necessary. The hot-plate of this cooker, as you see, has no bars passing through the flames. A set of ladders is provided for carrying unsuitable sized vessels. Many of these stoves are still in use, though their manufacture was ceased at the time when the keen competition among gas-stove firms brought down the price of cooking apparatus to a very low figure. Would that there were a little more of this kind of competition nowadays!

LIGHTING AND BURNERS.

Various gentlemen connected with the gas industry have at times expressed the opinion that electricity was the light of the future and that gas was gradually passing. I do not think that this will be so, if we resolutely foster in every way this most valuable load. The average business man or shopkeeper is far too astute to see either form of lighting superseded by the other. He is perfectly alive to the value of using both, and playing off one against the other in order to obtain the best terms. The essentials necessary in the retention of our position in the field of lighting are, firstly, a constant quality of gas with regard to density and inerts. To meet this necessity is by no means an easy matter at all times; but as far as the mixing of blue gas is concerned, this can and should be kept at a constant figure. Let a maximum be decided upon and rigidly adhered to. Often the temptation to mix more is great, in order to keep-down labour costs; but varying percentages will, if persisted in, spell the doom of gas lighting.

The next essential to my mind is a well-made gas-burner, with a properly designed mixing-chamber, and for preference no gas and air adjustment. The whole idea of these adjusters, even if properly made, seems to be quite wrong; and I have never yet seen a gas adjuster on any low-pressure gas-burner which could in anyway be termed fool-proof. What can be more crude than the single orifice closed by a pin hardly ever central, controlled by a small screw, usually very hot, which a wretched user (balanced precariously on a chair) is supposed to manipulate in order to accommodate his burner to the varying necessities and changed conditions at the gas-works. Many of the gas-burners which we are now able to obtain are little better than rubbish. Probably the manufacturers are not to blame; the buyers are. Price is a secondary matter. The gas-burner to be a serviceable instrument must be properly designed and made. Essentially feminine in character, our light is beautiful, white, and pure; but attach to the inverted gas-burner an exterior bye-pass and she becomes at once a fickle jade, unless regularly looked after by an efficient maintenance system. The only domestic gas lighting system supplied in small units which is really satisfactory without a regular service of maintenance is to my mind the inverted burner without a bye-pass. All other forms of gas lighting must have regular attention by an employee of the gas company whose interest is to give complete satisfaction. In other fields of lighting, we have high-pressure systems which will hold their own against the so-called half-watt lamp.

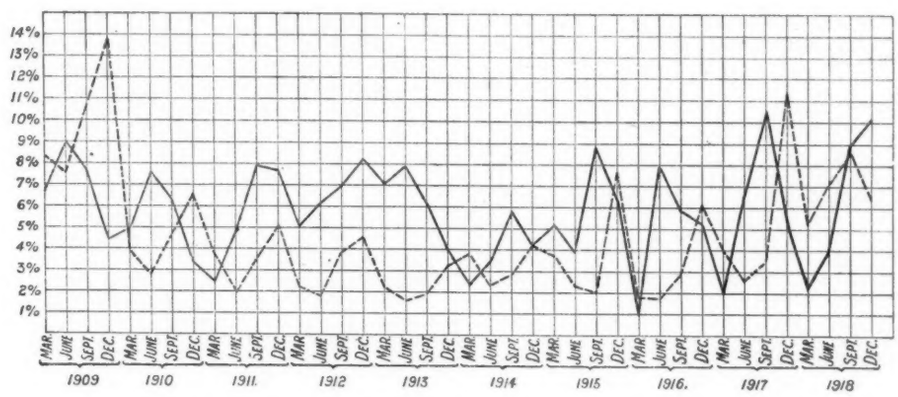
NAPHTHALENE AND LEAKAGE.

During the past year we have all read the valuable report of the "Life of Meters Research Committee," who have stated that the conditions under which naphthalene stoppages become numerous are similar to the conditions which cause dry gas-meters to register slow. At Maidstone for many years this has been noticed, as will be seen from the accompanying chart, on which are plotted the number of stoppages per month due to naphthalene and the quarterly uncorrected leakage.

The connection between the two is very striking. The meters I have examined which have been registering slow do not appear to be at all dry, but are usually oily. But naphthalene deposits on the valve-plate are common; and this, I believe, in itself can cause some of the mischief. The quality of the mechanism of recently repaired meters does not appear very good. I think many of us regret the combination which has taken place in the meter trade, and will do what we can to encourage outsiders to promote fair competition both as regards price and quality.

HIGH-PRESSURE DISTRIBUTION.

My Company's area of supply covers 78 square miles, and supplies of gas are furnished in eighteen surrounding villages. Low-pressure mains are employed with one exception. On the main Dover Road we give supplies to the villages of Bearsted, Hollingbourne, Leeds, Harrietsham, Lenham, and Sutton Valence—the last two being nine and eight miles respectively from the works. To give a full supply to these districts, a reinforced pressure system is provided. A high-pressure main carrying a pressure of 80 in. during maximum lighting hours serves our high-pressure lamps in the town; and at a point one mile from the works the pressure is reduced to nine inches. This is maintained as far as Hollingbourne, four miles distant; the few supplies taken off it being again reduced by governors to our ordinary distributing pressure of four inches. At Hollingbourne the pressure is reduced to four inches; and at Sutton Valence, four miles further on, we use two small gasholders as storage vessels and pressure equalizers. They are automatic in action; stops being fitted to the columns to prevent the holders rising to blowing point. This is safe, because the pressure at Hollingbourne cannot rise above four inches. The compressors are only in use during the hours of maximum draught; at other times an ungoverned gasholder pressure of five inches is sufficient for all requirements. Having other districts served entirely by low-pressure mains, I am satisfied in every way that an increased pressure is the cheapest and most satisfactory way of meeting increased demands, and giving uniform pressure. The compressing plant is only run at the time of maximum draught; and in this way heavy labour charges are avoided.



THE BROKEN LINE SHOWS THE NUMBER OF COMPLAINTS DUE TO NAPHTHALENE.
THE FIRM LINE SHOWS THE PERCENTAGE OF UNCORRECTED LEAKAGE.

REINSTATING THE FINANCIAL POSITION.

When we think of the future, we are at once faced with the necessity of re-establishing our financial position on a sound basis; for to continue under the present conditions is impossible. The first step was the combination of our forces and the formation of the National Gas Council, which has done such useful work, and to which we already owe so much. The second step was to convince Parliament that the preconceived ideas of maximum prices and sliding scale must be no longer considered sacrosanct, and must be altered to suit the new conditions. The next step will be to obtain such permanent terms of relief as will enable us to raise money to carry on business in the future without sacrificing the interest of those who have invested in the past. The original return allowed on the ordinary shares of gas companies was in nearly all cases 10 p.ct. In those days we were monopolists in the distribution of light, heat, and power through the public streets. Most of this original capital has now been changed in denomination to 5 p.ct. stock. It has been argued against us as being an effect of the sliding-scale, that the original holders have done extremely well during the prosperous years of

SKETCH SHOWING THE PARISHES IN THE AREA OF SUPPLY OF THE MAIDSTONE GAS COMPANY.

the past. I have searched the shareholders' register of my own Company, and can only find sixteen shareholders at the present time who held shares in 1880—the date of conversion. The remaining 629 stockholders have bought stock at gradually increasing premiums; and their present average returns, as authorized by the Statutory Undertakings (Temporary Increase of Charges Act), would be found to be in the region of £2 15s. 6d. gross.

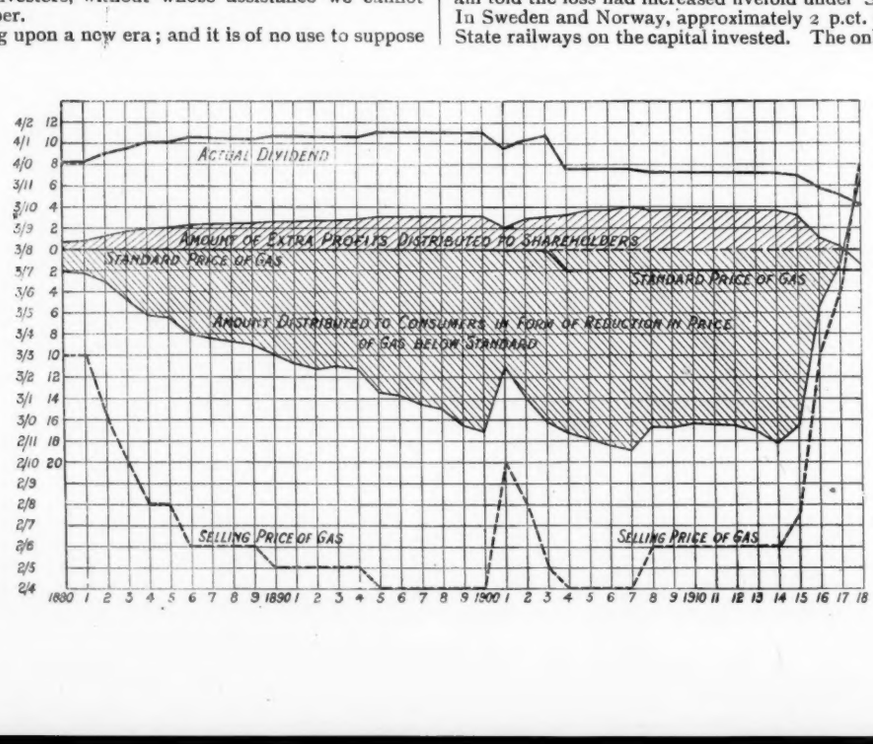
It is not quite clear what were the reasons which led to the adoption of the particular ratio of price and dividend usually adopted. In the opinion of the experts who testified in 1875, the rates proposed would result in a fair division of the additional profits of the undertakings between the shareholder and the public. I see that counsel for the Metropolitan Board of Works thought that an equal division would result; but it is a fact that, owing to the large increase in gas consumption since the days when the sliding-scales were adopted, the gas consumers have swallowed the lion's share. The chart giving the figures at Maidstone speaks for itself.

The position is that the gas consumer is paying more, and will continue to pay a high price for gas whether the interests of the shareholders are considered or not. But it will be always found that the selling price of any article is made up of the cost of material, cost of labour, and such a return on capital expended as will attract investors. It will probably be impossible to deal with all gas companies in one way; but a General Act could be devised on somewhat the same lines as the Statutory Undertakings (Temporary Increase of Charges Act), or alternatively the standard prices of all gas companies could be raised in definite proportion to the rise in the cost of labour and materials in each case. I think it can reasonably be argued that, if satisfactory relief is given to us, the consumers will not suffer. The fact that the interest of present shareholders has been safeguarded by Parliament will add stability to the position of our industry and will help to attract investors, without whose assistance we cannot expand and prosper.

We are entering upon a new era; and it is of no use to suppose that, even if we desired it, anything approaching pre-war conditions would again arise. One thing is certain. The wages paid in return for skilled and unskilled labour will remain at a high level, and also (arising from this) the price of commodities will be correspondingly increased. We have but to consider what a large proportion of the cost of our coal, our iron and steel, our refractory material, our machinery, and our brass goods and meters, is represented by the cost of labour to fully realize how much of the increase in gas prices is directly caused by labour advances. It is clear that general wages advances will not permanently raise the standard of living unless the incentive provided by high labour costs leads to improved methods of working. It is largely due to the high rates of pay current in the United States of America that numerous labour-saving devices are there in use in all forms of industry; as also the methods of standardization and multiple production which have been of so large a benefit to the export trade of America.

NATIONALIZATION OF INDUSTRIES.

The gas industry will always be a large employer of labour; but under present conditions the best brains of the industry will be undoubtedly more closely focussed on labour-saving machinery than in the past; while in other industries producing non-essential articles or luxuries, the increased cost of production will mean a decreased demand, and thus result in unemployment. One of the burning questions before the country at this moment is the nationalization of certain industries, such as the mines, railways, and electric power systems. Surveying the past, it does not appear that the nationalization of railways on the Continent has been a striking success. In Italy, before the war, the State Railways were run at a large annual financial loss to the Treasury. In France, the Government took over the management of the Western Railway in 1908. It was not then a paying concern. After four years, I am told the loss had increased fivefold under State management. In Sweden and Norway, approximately 2 p.ct. was earned by the State railways on the capital invested. The only really successful


ACTUAL DIVIDEND
AMOUNT OF EXTRA PROFITS DISTRIBUTED TO SHAREHOLDERS
STANDARD PRICE OF GAS
STANDARD PRICE OF GAS
AMOUNT DISTRIBUTED TO CONSUMERS IN FORM OF REDUCTION IN PRICE OF GAS BELOW STANDARD
SELLING PRICE OF GAS
SELLING PRICE OF GAS

instance were the German State railways, which were controlled by an autocratic government. A democratic government when controlling great industries will have many more difficulties to contend with than was the case in Germany. In Australia, it has been found necessary to set up a professedly non-political Commission as a barrier between Parliament and the railway management.

In our own country, our experience has been limited to the post, the telegraphs, and the telephone. A wider experience has been gained in the municipal control of public utilities. Can it be said that the gas industry municipal control has paved the way to better wages for the worker, cheaper gas for the public, better-kept works, more extensive and scientific research? I think not. The question was most thoroughly investigated in 1905 by the National Civic Federation of America; and from their report I gather that this was their conclusion also. State or municipal control up to the present time has had the advantage of cheap capital; but should wide extension of this form of trading take place, it will be found that this first advantage must inevitably disappear. Cheap capital means a good deal to any electrical undertaking, as the capital required is usually high. Will the State be able to provide cheaper capital than our municipalities have done in the past? I think not. The report of the Committee on Electric Power Supply recommends that no divisible profits shall be made. How many municipalities owning electrical undertakings do make profits? Not many in the South of England.

Turning to the engineering side of the question, we yet await figures as to the cost of distributing electricity by high-voltage systems. I believe it will be found on investigation that the distribution of electrical energy for long distances will be more costly, and the percentage of loss higher, than will the distribution of high-pressure gas. On the coal conservation question, we have overwhelming superiority in thermal efficiency, of which it is necessary that the public should be well-informed. But, as well as this, we must most emphatically protest against the State entering the power business, and subsidizing one form of power to the detriment of the other. If any form of power is nationalized, all should be treated alike.

Our future depends upon the demand for gas, which I believe will be greater than ever directly the fuel restrictions are removed and the work of housing is taken in hand. So we can look into the future with confidence. Provided the new Government will govern the country, and follow the paths of most rigid economy, then the industries of the country will gradually revive, bringing a happier and wider future for all classes.

AN INVITATION TO VISIT THE OLD KENT ROAD WORKS—POINTS OF THE PRESIDENT'S ADDRESS.

Mr. G. M. GILL (South Metropolitan Gas Company), said he had much pleasure in proposing a vote of thanks to the President for his most interesting address. He had touched on a good many subjects which were of great importance to them all at the present time. In the early part of the address, the President had referred to coal-store fires. In the South Metropolitan Company's works they had found they had been able to keep fires down to the absolute minimum by using a copious supply of water. They had water-pipes over all the stores; and, when there was a sign of any heating, they turned-on the water, and kept it on for twenty-four hours or longer. By watching the temperatures, they had in this way avoided fires, although they had had large quantities of coal in store at certain times. The President referred in his address to the importance of keeping inerts in coal gas to a minimum; and he also said that the maintenance of the lighting load, and the possibility of mixing blue water gas with the coal gas, depended largely on the question of inerts, and the making of a better quality of coal gas. It certainly seemed to him (Mr. Gill) that limiting the inerts was the best way of getting better results. By keeping the inerts down, one could obtain a bigger make per retort, and a bigger make per ton. That results could be improved in this way had been brought home to him very forcibly in his own experience. The President also referred to the poor quality of burners. This was a matter which vitally affected all undertakings. The burners were undoubtedly very poor indeed. In the South Metropolitan Company, it had been necessary to test each burner separately before sending it out to the public. It had been surprising to find how indifferent they really were; and, until they were tested, it was hardly recognized how poor they might be. He had been asked by his Chairman (Mr. Charles Carpenter, D.Sc.) to say that he had hoped to have been present to invite the President and the members of the Association to Old Kent Road some time during the summer, when the Chairman and Directors would be very pleased if they would come and have lunch with them, and have a look round the works. It was not intended that this should clash with the May meeting; and, so far as the Company was concerned, any time during the summer, they would be pleased to see the members there.

Mr. SAMUEL GLOVER said the "Head" of the Association had asked him to second this vote of thanks to the President; and he had great pleasure in doing so. Mr. Gill had been careful not to discuss the address; and he himself should avoid doing so. But he had hoped that Mr. Gill was going on to tell them how easy it was to do the things about which he had spoken. He (Mr. Glover) had not himself found it very easy to do some of the things they would all like to do. They all had the high ambition (as the President had) to obtain the very best results from every ton of coal handled on their works. This was not only an ambition, but a responsibility; and the President had endeavoured to realize the responsibility. He thought one of the most hopeful signs for the future of the industry, and for their own success as gas engineers, was that they were recovering for the nation the highest quantity of thermal gaseous energy from their coal. He was glad to find the President had helped them to study some of these points afresh. In one part of his address, he said: "Of the first method [steaming in vertical retorts] we have had during the last year information from several sources. Substantial increases in the number of British thermal units made available from a ton of coal have been obtained, and the gas evolved has been of satisfactory quality." He thanked the President for having called attention to these attainments in the industry. He (Mr. Glover) had been much interested in the President's remarks as to the effect of passing blue water-gas into the coal gas as early as possible, or earlier than he did himself at Maidstone; and he suggested the passing of the blue water-gas along the length of the foul main in contact with the hot tar. [The PRESIDENT: Hot vapours.] The point was that the President suggested that in this way the gas was enriched. They were first gas makers, and secondly tar makers; and if they took something out of the tar and put it into the gas, then it was not in the tar. In other words, they varied the quality of the tar by improving the quality of the gas.

The motion was very cordially carried.

The PRESIDENT thanked the members very heartily for the patience with which they had listened to his address. They were all very grateful to the Chairman of the South Metropolitan Gas Company for the kind invitation he had extended to them to visit the Old Kent Road works. As this was the first year after the war, he thought they might legitimately claim that they might have two outings this summer—one to Maidstone, and one to the Old Kent Road works. [Hear, hear.] When it was first suggested to him that he should take the presidency of the Association, he felt very diffident in the matter, because, when any engineer was going to show his works to his *confrères*, he naturally liked to have them in the best possible condition. He could not claim this was the case at Maidstone after four-and-a-half years of war. When, however, it was put to him that the Committee wished him to be President, he felt he ought to sink his own preference. It would be a great incentive to him to use the paint brush as freely as possible the next six weeks or so. [Laughter.] However, a visit to any works must be of use to them all. If they did not see anything to copy at Maidstone, they would see something to avoid; and afterwards they would visit the South Metropolitan works to see how it should be done. On behalf of the members, he cordially thanked the Chairman of the South Metropolitan Company. As to the time of the visit, their own May meeting would be just about ten days before the meeting of the Institution. Perhaps, therefore, it might be convenient to have the visit to the Old Kent Road works in July.

Mr. GILL said he thought that would be quite convenient.

This concluded the proceedings; and tea was afterwards served.

Gas-Works and the Supply of Motor Spirit.

An article, accompanied by illustrations of the Wilton benzol rectification plant, has appeared in the "Engineer," on the subject of "Gas-Works and the Supply of Motor Spirit." The author, who signs himself a "Gas Engineer," remarks that, as the situation stands at present, it may be said that a town gas having an average calorific power of 475 B.Th.U. gross would appear to meet the demands of all modern appliances; and, providing that no higher standard of heating power is laid down, there should be little difficulty in recovering benzol from the gas to the extent of rather more than a gallon per ton of coal carbonized. The chief point to bear in mind is, he goes on, that benzol extraction is not by any means a highly lucrative proposition for gas-works; and presuming that future standards of quality come to be fixed at a higher level than that already suggested, it would scarcely be to the interest of the gas-works to curtail their yield of gas per ton of coal within such limits as would enable them to conform with rigorous standards as well as extract benzol. Considering the cost of rectification, the writer remarks that it is, perhaps, in this direction that the chief difficulty of the smaller gas-works lies, in that, if a standard price for benzol is fixed, they will be at a disadvantage as compared with works that produce large quantities. As a matter of fact, the cost of recovering the crude spirit shows very wide differences between one gas-works and another. However, an estimate is given which shows that, in the case of medium-sized gas-works the cost of recovering the crude spirit approximates to 10d. per gallon, and 1s. for smaller works. To this has to be added the cost of rectification, canning, and distribution, and a reasonable profit, "so that there would appear to be little likelihood of the spirit ever being retailed at much less than 2s. 4d. per gallon."

Suspension of the Calcium Carbide Order.—The Minister of Munitions announces that the Calcium Carbide Order dated September, 1917, is suspended. It will thus be permissible for traders to deal freely in calcium carbide without a permit from the Ministry.

Temporary Increase of Charges Act.—Applications have been made to the Local Government Board for Orders under the Statutory Undertakings (Temporary Increase of Charges) Act, from the Abergavenny Corporation and the Tyldesley-with-Shakerley Urban District Council.

Ammonia Control Order Suspended.—The Minister of Munitions has suspended the Ammonia Control Order. Until further notice, therefore, it will be permissible to manufacture and trade in ammonia and the products containing ammonia without obtaining a licence from the Ministry.

Sir Dugald Clerk's Society of Arts Paper.—To-morrow (Wednesday) afternoon, at the Royal Society of Arts, John Street, W.C., a paper on the "Distribution of Heat, Light, and Motive Power by Gas and Electricity" will be read by Sir Dugald Clerk, K.B.E., D.Sc., F.R.S. The chair will be taken at 4.30, by the Right. Hon. Lord Moulton, G.B.E., K.C.B., LL.D., F.R.S.

MIDLAND ASSOCIATION OF GAS ENGINEERS AND MANAGERS.

ANNUAL GENERAL MEETING.

The room was well filled with members when, at the Grand Hotel, Birmingham, last Thursday afternoon, the outgoing President, Mr. W. Chaney, of Birmingham, called to order the annual meeting of the Association. The programme was a full one; the meeting lasting just three hours. After the formal business had been got through, Mr. W. Goodrich, on behalf of the Coal Controller, explained the present position and future hopes in regard to gas-works coal supplies; and thereafter the new President, Mr. A. T. Harris, of Market Harborough, delivered his Inaugural Address. This was followed by further consideration of the papers read by Mr. H. E. Copp and Mr. W. A. Twine at the last meeting; and on the conclusion of the proceedings, those present took tea with Mr. Harris.

The Hon. Secretary (Mr. W. G. S. Cranmer) having read the minutes of the previous meeting, they were confirmed. The receipt was intimated of a number of letters of apology for absence.

New Members.

The following new members were elected, on the proposition of the President, seconded by Mr. C. H. Webb (Stourbridge): Mr. W. Wilson, Engineer and Manager of the Burton-on-Trent Gas Department; Mr. Arthur Roberts, Engineer and Manager of the Hereford Corporation Gas-Works; Mr. W. H. Wise, Engineer and Manager of the Droitwich Gas-Works; Mr. R. G. Marsh, Fittings Engineer to the Birmingham Corporation Gas Department.

The Report and Accounts.

The forty-first annual report stated that "with the reconstitution of the National Gas Council and the formation of District Committees, the Association will be relieved of the discussion of many subjects which have taken up a great deal of time during the past few years, and the Association will in future be able to devote the whole of the time at their meetings to the consideration of technical matters which, in view of the strenuous competition the industry is faced with, will be of increasing importance." It was with the greatest regret that the Committee had to record the death of two prominent men in the gas industry who were both members of the Association—Mr. Thomas Berridge, J.P., of Leamington, and Mr. Fletcher W. Stevenson, of Coventry. During the year nine new members were elected. The accounts showed a balance in hand of £59.

The President said he did not think there was very much to comment upon in the report. The finances, perhaps, were not quite so good as they would like to see them; but this was more or less due to the increase in the printing and stationery bill.

The report and accounts were adopted, on the proposition of Mr. A. T. Harris (Market Harborough), seconded by Mr. G. Stevenson (Long Eaton).

Report of the Commercial Section.

The President said that unfortunately neither Mr. J. Ferguson Bell nor Mr. Hubert Pooley was with them; but they had present the able Secretary (Mr. S. Trow Smith), who would no doubt deal with any necessary points.

Mr. S. Trow Smith (Malvern) then moved the adoption of the report, remarking that there was no need to go into the matter fully, as all the members of the Commercial Association had had copies of the report, and had accepted it. There was no doubt that in the past year the section had proved its value by the various subjects that had come under discussion; and the members of the Association generally had had an opportunity of seeing the work of the section in the joint meetings which had been held on the tar question. This was a serious question to everyone, and really vital to the industry. It was not settled yet; but it was to be hoped that the scheme had got so far on the way that a settlement would not be long delayed. The expenses of the past year had been a little less than the income; so that the section was in a good financial position.

Mr. J. R. Duff (Banbury) seconded the adoption of the report, which was agreed to.

THE COAL POSITION.

The President said they had with them Mr. Goodrich, who was very anxious to explain what was in the mind of the Coal Controller as regarded the supply of coal to gas undertakings. Though he was anxious to explain, no doubt the members were much more anxious to hear what Mr. Goodrich had to say. ["Hear, hear."]

Mr. W. Goodrich was afraid, in introducing him, the President had not put the matter quite as it should have been put. He did not know that he had any particular anxiety to explain to them what the Coal Controller wished to do. Rather he was there that afternoon to give them a little information, and to endeavour to satisfy, if possible, any doubts which might be in the minds of the members. He was sure they had hoped that by this time the position, so far as coal supplies were concerned, would have materially improved; and there was every reason to anticipate that by the middle of March the position would have eased very considerably. But most unfortunately, from a variety of causes, the position was not altogether satisfactory yet. ["Hear, hear."] He was not going to worry them with all these causes; to do so would be neither permissible nor fair. The fact remained, however, that the position had slightly improved; and he could give them the figures for the last four weeks, which he thought would serve to illustrate what he said—that though the position was not satisfactory, it was on the mend. Taking the whole of the gas-works in the Provinces—that was outside the 34 works which were included in the Greater London area—for the week ending Feb. 7, the stocks averaged 1·49 weeks. The following week (to Feb. 14), the average was 1·72 weeks; for the week ending Feb. 21, there was a drop of 0·1 to 1·71 weeks; and in the last complete week he had a note of (ending Feb. 28), there was a rise to 1·85 weeks. He thought he might say from what he knew of the figures now in course of preparation, that they would be rather better for the next week; and there was every reason to hope now that they would be steadily improving the situation. He was sure they would all have clearly impressed on their minds that the situation very badly needed improving. ["Hear, hear."] It was, however, just as well to bear in mind that the problem was an extremely complex one, and that during the winter which was now, they hoped, closing there had been a great many difficulties to contend against—some of them very serious ones indeed. Within the past few weeks, when they had anticipated that the situation would have been improving, there had been a spell of severe weather, which had to a considerable extent sent up the demand for household coal; and this had occurred just at the time when gas-works stocks were perhaps at the lowest point.

Water Gas Production and Coal Saving.

Proceeding, Mr. Goodrich said it might prove of interest if he gave them a few figures with regard to water gas production. In June last year, the Coal Controller appealed to the gas industry to do their utmost to assist in the conservation of coal by making either carburetted water gas or blue water gas. He was not sure that carburetted water gas was mentioned, because at that time, with oil at 1s. 4d. per gallon, blue water gas was more likely to be advocated. Since his Department began to get accurate records week by week, from the beginning of October, some astonishing results had been obtained. For the five months from October to the end of February, the total weight of coal saved had reached 1,522,266 tons; and he was sure they would agree that this was a very fine figure indeed. It reflected great credit on the gas industry, showing as it did that they had done something very tangible towards helping in the conservation of coal; and there was no doubt whatever that, had it not been for the great effort which was being made in this direction, it would have been absolutely impossible to have got through the winter even in the unsatisfactory manner that they had managed to squeeze through it. He need not labour this point; for it would be perfectly obvious to every one that, had it been necessary to find during the past five months even one-third of the coal which had been saved in the way he had pointed out, there must, under the conditions which had existed, been failure to do so. If the members desired to put any questions to him, he would be pleased to answer them to the best of his ability.

The Point of View of the Gas Undertakings.

This invitation on the part of Mr. Goodrich to reply to any queries that might be put to him, resulted in a large number of questions being asked; and in his replies to these he gave the inquirers all the satisfaction in his power, though much of what he said is not available for publication.

The President remarked that they were very much obliged to Mr. Goodrich for coming to the meeting and explaining the position as regarded coal. He thought, however, they could gather very little comfort from what they had been told. They had to face the question of using carburetted water gas. What it meant was that the willing horse was going to be flogged again. With regard to the use of blue water gas, this recoiled on the heads of the gas undertakings. From patriotic motives they had put blue water gas in their mains, and they had got the credit for doing it, if not for the motive. The consumer perhaps found that his gas was abnormally bad; and however much they might endeavour to explain the patriotic motive, this did not altogether allay the feelings of the consumer. If the price of oil was reduced, it would be a matter for consideration as to whether, at the present cost of coal, it would not be really better to manufacture carburetted water gas. He would have liked to have heard something of the possibilities of stacking coal over the summer months, as they had heard there had been some improvement in stocks; but the gain had not been a very great one. He would like some assurance as to a further early improvement.

Mr. R. S. Ramsden (Leamington) drew attention to the desirability of the Coal Controller affording some help to gas-works that had had offers from merchants to supply coal if gas undertakings would send wagons for it. At Leamington their stocks were very low; and the representative of a firm of merchants had called upon him, and said he could supply certain Yorkshire slack if he (the speaker) could send wagons. It would be a great assistance if the Controller could earmark a number of wagons for this business.

Mr. C. H. Webb (Stourbridge), referring to a suggestion that they should increase their stock of gas oil, pointed out that those who had a very small stock of coal would naturally have a small amount of coke to manufacture water gas with. He had a great deal more oil than he would have coke to use with it; and, in certain eventualities, if he stopped the sale of coke, what would be the point of view of the Local Fuel Overseer? Would he have authority to take any of the stock of coke which would certainly be required for gas-making purposes? Turning to another matter, his works and several others had had coal offered by the Controller, which they accepted, on the undertaking that they would pay a certain sum to the gas company from whom the coal was taken. On the other hand, his coal had been

taken for another gas-works, and he had received nothing for it. He failed to see the equity of this.

Mr. G. STEVENSON (Long Eaton) expressed anxiety as to whether there was any probability of relaxation of the area scheme.

Mr. VINCENT HUGHES (Smethwick) looked forward to the time when the Controller would be able to allocate gas coals, instead of household coals, for gas-making purposes.

Mr. W. M. VALON (Stafford) said there were collieries from which he had obtained his coal for years, with a railway freight of about 2s. They had still these contracts; but the Coal Controller was sending the coal past his (the speaker's) door, direct to London, and substituting for it Durham coal which cost 10s. 6d. per ton more. He could not understand why he should have to pay extra freight, and his coal go on to London.

Mr. W. E. CATON (Oxford) asked whether the figures of increase given for stocks of coal over the last few weeks was based on the average of six weeks' maximum quantities used, or on the present amount. This might account for the difference.

Mr. C. M. D. BELTON (Shrewsbury) said the figures they had heard were very illuminating. As for himself, 0·5 had been his quota of stock for many months now. He kept at even this level only by reduced pressures through the winter months. If they had not reduced their pressures very considerably over the major part of the time when they should have been reaping their profits, they would have been without coal altogether.

Mr. W. A. SAPEY (Tamworth) quoted a case of one merchant asking 2s. per ton more than another for the same coal.

Mr. F. ROBINSON (Swadlincote) remarked that he, for one, wished to offer his thanks to the Coal Controller for what he had done.

Mr. C. H. CARDER (Oldbury) said it would be rather interesting to know whether, in getting out the figures of increased stocks of coal, the influence of possibly an increased mixture of water gas had been taken into consideration. He had been sending out as much as 50 p.ct. of carburetted water gas. It was only by this means that he had been able to keep up a supply at all. Coal supply figures were very useful, if one knew the conditions attaching to them; but if they were obtained at the expense of greater water gas admixture, they were entirely fallacious.

Mr. H. E. COPP (Etruria) said he would like to ask if the gas industry, having saved 1,200,000 tons of coal by the manufacture of water gas, and also having rendered great service to the nation during the war, was at all likely to receive any greater consideration at the hands of the Government. ["Hear, hear."]

Mr. GOODRICH said his department had every intention of devoting themselves as closely as possible to the building-up of gas-works coal stocks. This was not an empty remark, because gas-works supplies stood very high in priority. But, when everything possible was done, it must be a slow process, for the simple reason that stocks throughout the country had reached such a low level, and such a large quantity of coal was wanted, apart altogether from current consumption, in order to bring their stocks up to anything like a satisfactory level. For the building-up of stocks equal to four weeks' winter consumption, there would be required, in round figures, something like 700,000 tons of coal, to be put into about 1200 to 1300 gas-works, in addition to the coal for current consumption. As much coal as possible was now being carried by water, in order to relieve the railways. A gas manager was quite entitled to keep his coke to satisfy his demands for gas. In the matter of diversions, the Coal Controller had to take a broad view of the situation. The output of gas coal in Durham had consistently improved week by week; and this had enabled the Controller to deal more efficiently than would otherwise have been possible with a difficult position. The stock basis was the heaviest week they could find in the winter 1917-18. That was, the heaviest week selected out of six heavy weeks in December, 1917, and January, 1918. Of course, at that time many of those who were making water gas were not making it to the extent that they had been since, and some were not making it at all. His Department realized the constant anxiety and strain it must be to a gas engineer who had to run his works on a narrow margin of coal, and had to think of reducing his pressures and depriving consumers of gas either partially or entirely. Under very difficult conditions, they had endeavoured to maintain supplies; and, so far as he knew, they had not let-down a single works in the country.

The PRESIDENT said they were very much indebted to Mr. Goodrich; and he proposed that they give him a hearty vote of thanks for his kindness in coming and so forcibly explaining the situation.

Mr. COPP, in seconding, said gas people sometimes felt they had lacked a good deal of sympathy.

The vote was heartily accorded; and Mr. GOODRICH briefly acknowledged it.

REPRESENTATIVE ON THE COUNCIL OF THE INSTITUTION.

The PRESIDENT said the next item was the election of a representative to the Council of the Institution of Gas Engineers. This honour, he believed, had always fallen on the shoulders of the new President; and he proposed that Mr. Harris be elected.

This was agreed to.

THE VOLUME OF ASSOCIATION REPORTS.

The PRESIDENT said no doubt members had noticed that the price of the "Reports of Proceedings of District Gas Associations" had gone up; and the Committee would like some guide as to the course they should adopt. The annual subscription to the Association was only 10s. 6d.; and if they were going to give the volumes away to the members, there would not be much money left for the work of the Association.

Mr. C. H. WEBB (Stourbridge) remarked that, from the Secretary's point of view, it was quite a good thing to issue these volumes to members who were not in arrear with their subscriptions. It seemed a matter of adding the increased cost to the subscription, or asking the members to buy separately. The balance-sheet showed that they began the year with £71 in hand, and finished about £12 down. If the expenses were likely to be reduced shortly, they could go on as they were doing for a year or two, because there was no need for them to have a large balance. A paper cover might be used to cheapen the cost of production of the volume.

Mr. W. S. MORLAND (Gloucester) proposed that the subscription be increased by 5s. to cover the cost of the "Transactions."

This was seconded by Mr. W. M. VALON (Stafford), and supported by Mr. W. PRINCE (Tipton).

Mr. W. C. JONES (Brierley Hill) moved as an amendment that each member should buy his own copy; but this found no seconder.

Mr. C. H. CARDER (Oldbury) thought it desirable that a member of any association should be presented with a record of the association's proceedings.

Mr. PRINCE raised the point as to whether the members had power under the rules to alter the subscription at that meeting; and after some further discussion it was agreed, on the proposition of Mr. VINCENT HUGHES (Smethwick), seconded by Mr. JONES, that the subscription should remain as hitherto, but that members who desired a copy of the "Proceedings" should forward an additional 5s. a year to the Secretary.

THE CHANGE OF PRESIDENTS.

The PRESIDENT said his next duty was the pleasant one of inviting Mr. Harris to take the chair as President for the next twelve months. They all knew Mr. Harris's capabilities. He was a very old member of the Association, and had taken a keen interest in its proceedings. There was ample scope for him in the next year; and it was a great pleasure to welcome him to the position he was about to occupy.

Mr. A. T. HARRIS (Market Harborough), who met with a cordial reception on taking the chair, proposed a hearty vote of thanks to Mr. Chaney, who, he said, having regard to the great calls made upon him during his year of office, due to war exigencies and the magnitude of the works he had to control, had performed more than the average president had done.

Mr. PRINCE seconded the proposition, remarking upon the excellent manner in which Mr. Chaney had conducted the business of the Association.

The vote was cordially passed; and Mr. CHANEY briefly acknowledged it.

Mr. HARRIS then delivered the following

INAUGURAL ADDRESS.

Permit me, first, to express my thanks for the honour you conferred upon me by electing me your President, more especially so as I believe I am in charge of a smaller undertaking than that of any previous President of the Midland Association. I attribute the compliment as an appreciation of my long connection with the Association and the gas industry. As to the latter, I think that we can as a family claim a record in respect to numbers and length of service in the active management of gas-works. My father assisted to build the Droitwich Gas-Works in 1837, and became its first Manager—a position he held, jointly with myself, at the time of his death in 1887. My brother, at Wigston, has now completed 47 years' continuous management. My own record is 35 years—all spent in the service of two local authorities. There is, therefore, continuous management of 82 years, and an aggregate of 132 years by my father, brother, and self. In addition, I have at the present time six nephews holding similar positions, and another an assistant engineer.

THE MARKET HARBOROUGH GAS-WORKS.

The gas-works at Market Harborough were acquired by the Urban District Council (by compulsory purchase) in 1899—a few months previous to my appointment. As the usual result of such a method of purchase, high capital charges in proportion to the output were incurred, amounting to 1s. 3d. per 1000 c.ft. during the first financial year after purchase. This has now been reduced to 9d. as the result of increased sales; the output being more than doubled during my period of management. The works have been practically reconstructed out of revenue, and considerably enlarged, and are capable of meeting a much larger demand than the present output of 60 millions. The last addition to the plant was the erection of a spiral-guided gasholder, 100 ft. in diameter, with two 25 ft. deep lifts. The contract was placed early in 1914, and was completed in 1916 without additional war charges. The cost, including the brick and puddle tank, was slightly over £17 per 1000 c.ft. storage. The total storage capacity is slightly over 48 hours' maximum output.

THE RETORT-HOUSE.

Regenerator retort-settings were laid down in 1900. Although the bench is fitted with the ordinary hydraulic main, with separate section to each bed, the dip-pipes are not sealed, except during the period of drawing and charging the retorts, which are horizontal. The arrangement for sealing and unsealing the dip-pipes is very simple, and consists of a rectangular box fixed at a suitable height at the back of each section of hydraulic main, to which it is coupled by a 2-in. wrought-iron pipe, which conveys the sealing liquid from the main to the box or *vice versâ*. The box is fitted with a wood plunger, the raising or lowering of which unseals or seals the dip-pipes at will. This is operated from the retort-house floor by means of a wire rope running over pulleys; the rope being secured to a clip on the ascension pipe when the pipes are unsealed. The arrangement has been in use for the past fifteen years, and has undoubtedly contributed to a high yield of gas per ton of coal during this period. I am firmly convinced that best results cannot be obtained, or ideal conditions exist, within the retort with the fluctuation of pressure or exhaust inseparable from the use of sealed dip-pipes.

The installation of a retort-house governor in its early days proved a valuable adjunct to the carbonizing plant—giving the

steadiness of exhaust and control and manipulation of adjustment so essential to ensure the best results, both as regards quantity and quality of the gas produced. By a series of weights operated from the floor of the retort-house, adjustment of less than 1-10th pressure or exhaust can be made to suit the varying make and quality of the gas. The foregoing combination, in conjunction with fairly high heats, has resulted in a production during several years past of slightly over 13,000 c.ft. of gas per ton of coal carbonized; the coal used being 45 p.ct. of Derbyshire and 55 p.ct. of South Yorkshire.

STEAMING.

With a view to the adoption of machinery in the future, the retorts are fitted on the back ends with short mouthpieces, rendering them very adaptable for steaming purposes. This has been in operation for the past four months; the steamed retorts being hand-charged from each end, and filled completely for a length of about 10 ft. Steam was first introduced without superheating, but soon abandoned; the coke at the point of steaming becoming quickly saturated with moisture, and the local temperature of the retort considerably reduced. For superheating the steam, a 1-in. pipe is run along the bottom of the flue below one of the bottom retorts; and satisfactory steaming is now obtained at a constant pressure of 15 lbs. At first, a ⅛-in. jet of steam issuing from a hole in the end of a ½-in. cap was tried. Apart, however, from frequent choking of the hole, preventing the flow of steam, it was found that the steam had a tendency to escape quickly to the sides and top of the retort—due probably to striking the coke at a fairly high velocity and escaping at the points of least resistance. A ½-in. pipe, with open end inserted about 2 ft. in the back end of the retort, is now in use, giving no trouble and requiring little attention.

The retorts are emptied and re-charged every twenty-four hours. The back half of the retort is charged with two-thirds coke breeze and one-third coal; the front half being all coal. The quick heating of the breeze permits steaming being commenced on a reduced scale within a short period of charging; the steam being increased to the desired maximum point eight hours after charging, and continued for a further period of sixteen hours. With this period of steaming, very little deterioration of the coke from the coal end of the retort is apparent; the residue from the coke breeze and coal being usable for steam-raising purposes.

Unfortunately, owing to coal deliveries being below requirements (necessitating a portion being taken from stock and not weighed before use), reliable figures of the results obtained over the whole period cannot be given. A reliable test extending over one week with a proportion of one retort in five steaming, gave a production of slightly over 15,000 c.ft. per ton of coal carbonized, with a calorific value of 490 B.Th.U. tested with a total-heat calorimeter. The average production of gas per mouthpiece is slightly less since steaming.

PURIFICATION.

The use of lime for purification was discontinued in 1902; purifying costs then being 2d. per 1000 c.ft. With the use of oxide of iron only, these costs have been reduced to as low as 0·09d.—being 0·14d. for last year; the oxide being loaned.

The purifiers are four in number, and consist of two 20 ft. and two 15 ft. square boxes. By the use of air for revivification and reversing the flow of gas, changes of purifying material are seldom necessary. The 20 ft. boxes have run for as long a period as two years. Owing to the hardness of the material, and the difficulty and cost of removing it from the purifiers, it is found to be false economy to run for so long a period. Changes of purifying material are now mostly performed in the summer months, when surplus retort-house labour is available; it being seldom found necessary to renew the material more than once in each of the smaller boxes during the winter months. Hurdle grids are fitted in each purifier, and no trouble from back-pressure is experienced. Steam is admitted at the inlet of the first two purifiers, a temperature of from 80° to 90° Fahr. being maintained.

THE "A. AND M." PRESSURE-WAVE SYSTEM.

The "A. and M." pressure-wave system of lighting and extinguishing the public lamps has been in operation since 1912. The system has proved reliable and satisfactory, and effected considerable economy both in cost of labour, mantles, and gas. With the increased costs now prevailing, the value of any automatic system is considerably enhanced. During the air-raid of Jan. 31, 1916, the system undoubtedly proved a contributing factor to immunity from damage to the town of Market Harborough. The first intimation of the presence of Zeppelins in the district was the sound of explosions from bombs dropped a few miles distant. Within a few minutes, and before the lamps could have been extinguished by hand, Zeppelins were hovering over the town. The extinguishing of the lamps was the official local warning of danger, and undoubtedly prevented the occupants of the Zeppelins from locating the town.

EFFECT OF RESTRICTIONS ON CONSUMPTION.

As the result of the war, the output has considerably decreased; this being further accentuated by the operation of the Household Fuel and Lighting Order, which I estimate has reduced the consumption by at least 12½ p.ct.

THE NATIONAL GAS COUNCIL.

The reconstruction of the National Gas Council was a move in the right direction; a very active early existence being assured, having regard to the many urgent problems affecting the industry now under consideration. The subscription is exceedingly low, and should ensure the support of the smallest gas undertakings, whose interests in the present crisis are more seriously affected than the larger undertakings, due to higher labour and working costs of production.

THE GAS INDUSTRY'S WAR BURDENS.

It is difficult to conceive a more remarkable position than that of the gas industry, both during and consequent upon the war. No industry has contributed more to its success, or been more adversely affected as the result of restrictions and conditions imposed in respect to prices obtainable both for residual products and gas; while costs of productions have been allowed to increase practically without restriction. In the early stages of the war, an urgent appeal was made to assist in the production of explosives vital to its conduct and success. This met with a ready response; the first consideration being to assist the nation in its hour of need. In many cases very great expenditure on special plant to accelerate production was incurred, although the prices obtainable for the products did not yield an adequate return on the capital outlay.

With regard to tar (especially that treated for the recovery of explosives), surely this war product should have appreciated in value, as in the case of other war necessaries, such as Army boots, &c. The prohibition of local sales caused considerable loss in many cases; but no assistance or protection was given to ensure a fair war value being secured for the bulk. The only outlet in the majority of cases was through distillers, organized in such a manner as to practically control the prices obtainable by individual undertakings.

The position in respect of sulphate of ammonia has also been manifestly unfair for a considerable period. While the cost of production has increased by 200 p.ct., the Government has so limited the selling price as to reduce the net receipts below pre-war level. True, some relief has recently been granted in the form of a subsidy; but the amount is altogether inadequate to meet the increased cost of production.

Briefly, the imposition of restrictions during the war has forced owners of gas undertakings to become philanthropists; while the retention of legislation not just or applicable to war or post-war conditions has, and is, inflicting serious financial loss on shareholders of gas undertakings, both in respect to dividends earned and the value of capital invested. The effect of the Temporary Increase of Charges Act, 1918, does not in the majority of cases afford sufficient relief to maintain dividends or capital values at their pre-war standard. The dividends guaranteed to shareholders of railway companies by the Government, and the enormous profits permitted to be made by other industrial concerns, are in very strong contrast to the restrictions imposed upon gas undertakings.

By the time the extended period of relaxation of the illuminating standard expires, I am hopeful that instructions to make such relaxation permanent will be issued. The relaxation granted owing to the exigencies of war has proved that, under present-day conditions of supply and use of gas, former illuminating standards are neither necessary nor economical, and, if reimposed, will undoubtedly involve serious increased costs of production, which must ultimately fall upon the consumer.

Present indications point to a calorific or heat value becoming the official standard of the future. This undoubtedly represents the standard of efficiency most necessary to consumers, having regard to the present-day methods of lighting and other purposes for which the bulk of the gas is used.

Much diversity of opinion exists as to the relative merits of high and low standard gas, and many factors require consideration in determining the most economical quality to manufacture combined with suitability of requirements of consumers. This subject has been so fully discussed of late, both at meetings and in the Technical Press, that further comment by me would only be a repetition of information already in your possession. The subject is of vast importance. Finality has not yet been reached either in the economical or quantity production of gas; and the gas industry should not be content with a rigid standard being imposed, which will have the effect of hampering progressive and economic operations in the future.

The ever-increasing cost of materials and labour is passing from the serious to the vital stage, if not approaching what may be termed the breaking point. The excessive cost of meters and stoves can only tend to restrict the expansion of business. Profits will not be available for their purchase under existing conditions; while the excessive amount required for the repayment of short-period loans renders borrowing for such purpose prohibitive unless inflated rental charges are enforced.

The demands in respect to wages seem to have no finality, and are made without due regard to local conditions. The universal application of fixed increases inflicts special hardship on the smaller works, where conditions of labour and the increased cost of living differ from those existing in large towns. The application of the eight-hour day to such works will most seriously affect the future of many such undertakings. I am, however, strongly in favour of eight-hour shifts for stokers where possible. This has for many years been in operation at Market Harborough.

Coal conservation looms largely in the foreground to-day, and demands national attention. Given the necessary freedom of

action, gas engineers can, and will, assist in achieving the desired object by the better utilization and use of the heat units contained in the coal. It is up to the gas industry to expose the fallacy of the claims made in this direction by the promoters of the super-station electric scheme.

In conclusion, as my term of office may be described as Peace Year from a military point, I would express the earnest wish that it will synchronize with a similar consummation in the industrial world.

SUPER-STATION ELECTRICAL SCHEMES.

Mr. CHANEY said they had listened to a very able and illuminating address, which touched upon many topics that were of great moment just now. Some of the points that had been brought out would sooner or later force themselves upon the industry—particularly the super-station electrical schemes. There was mention of the adverse times that gas undertakings generally had had to go through during the war. They had not complained, perhaps from patriotic motives; but they had been handicapped, and that the electrical people had been allowed to get one ahead of them was apparent. They had been handicapped in the matter of supplying good gas, because they had been forced to use inferior coals, to use blue gas, to reduce the calorific value of their gas, and to increase the inerts. All this had prejudiced gas to a very great extent.

Mr. VALON seconded the vote, which was carried with applause.

The PRESIDENT, in acknowledgment, said that he was much disappointed with the effort he had put before them, but it expressed his feelings. He thought that, as an industry, they had, during the last four years at any rate, taken things too much lying-down. While the industry had made immense sacrifices—not only the undertakings, but the officers—there had been operating in other directions factors which, if they matured, would tend, so to speak, to "wipe them out." He hoped that, now they had a reorganized National Gas Council, they would, in their transactions with the "powers that be," display more firmness of front than they had done in the past. They wanted to make clear the work they were doing, and that there was not only too much money, but also too many interests of the public, at stake for an industry like the gas industry to be wiped out without due consideration being given to the work it was doing.

BENZOL AND NAPHTHALENE RECOVERY.

At the autumn meeting, two papers were read; but there was no time to discuss them then, and so any comments were left over to this meeting. The papers were: "Notes on Benzol and Naphthalene Recovery," by Mr. H. E. Copp (Etruria), and "Chemical Engineering in Modern Gas-Works," by Mr. W. A. Twine (Birmingham)—see "JOURNAL" for Nov. 5, 1918 [p. 311] and Nov. 12 [p. 369]. When this item on the *agenda* was reached, Mr. Twine displayed a number of very interesting lantern slides which had been prepared to accompany his paper, but which there was no opportunity to throw on the screen at the meeting at which the paper was read.

The PRESIDENT said he thought it would be well if they took the discussions jointly, because the papers bore upon each other. With regard to Mr. Twine's paper, what he advocated had been exemplified by the work Mr. Copp had done. In Mr. Copp they had a chemist as well as an engineer; and what he had done in the matter of the recovery of benzol and naphthalene, proved what an important thing it was for the chemist to have a knowledge of engineering, as well as for the engineer to have a knowledge of chemistry. He would first of all ask Mr. Copp and Mr. Twine if they had any further remarks to make upon their papers.

Mr. COPP said he did not know that there was anything very much he wished to add to his paper. With regard to the first portion of it, the criticism was offered that a lot of the matter was extraneous. He admitted freely that it was; but it was the only opportunity he had to get something "off his chest" which he had wanted for a long time to get off. He thought he had been more or less justified when he heard the Presidential Address a few minutes ago, because it emphasized many of the points that he had in his mind. It must be remembered that he wrote his paper before the termination of the war. The substance of the paper had greatly decreased in importance since the armistice. He felt that one of the chief things the gas industry needed to-day was a sense of proportion; they needed to discriminate between the things which were important and those which were not. Sometimes they heard discussions by various bodies connected with the industry on subjects which, if analyzed, would prove to be of the most minute importance; and at other times they found the most important subjects being skimmed-over with but very few remarks. Though, as he had said, he felt that most of the importance of his paper had departed, there was still a subject of minor importance which remained—that of naphthalene prevention. He did maintain that what he had told the members was the truth, the whole truth, and nothing but the truth. There was not much to be added to it at the present time; but he was glad to be able to say that he could substantiate every statement made in the paper. There was one small point to which he might refer, and that was the difficulty of the corrosion of the superheaters of the benzol plant. This was a difficulty which was still with them. He thought he had overcome it, but must confess he had not done so, though he had adopted what was more or less of a remedy, in that he had now, instead of the type of superheater which was usually supplied for this plant, a very simple sort of casting which, when it corroded, could be replaced at but little cost. It was a plain casting; and when one broke-through or corroded-through, he had no hesitation in replacing it. The cost was, as a matter of fact, very much less than the pattern originally supplied with the plant. Another point he would like to mention was that the duty of these superheaters might be very much minimized by the introduction of a closed steam-coil in the bottom of the still, thereby reducing to a considerable extent the duty which was necessary in the pre-heating of the oil; and it must be borne in mind that the whole of the success of the plant and system depended upon heat-interchange. He thought the closed coil in the still was adopted previous to the war in all German-made plants. Again, the Ministry of Munitions and Dr. Colman very strongly advocated the use of green oil as a washing medium. It might have been quite ideal for the production of benzol—in fact, it probably was—but there was no doubt whatever that creosote was far more suitable for the extraction of naphthalene. It had a much greater affinity for the phenols. As the result of his paper, he had had several inquiries as to what he got in his settling tanks. Some people asked, "How do you separate the oil from the naphthalene?" His answer was that he did not get any oil. It was nothing more or less than water and naphthalene. This was due to the fact that the apparatus was kept at a constant temperature. If the temperature was maintained at 96° C., one got no oil. On sublimation, very nearly a pure salt was obtained, which commanded a much higher price. Naturally, people would ask what was the effect of using this system. He did not profess to be able to get all the naphthalene out, because the physical conditions were against it; but he did profess to get out all he wanted to. There was no need to take it out for the sake of taking it out; and he had not striven to remove it all. To do what he had done took him some considerable time; and he had some diffidence in writing his paper, as he had not quite got rid of his naphthalene complaints. He occasionally had one or two even now; but the number was negligible. Mains had been cleared by him which had been more or less stopped with naphthalene for many years. He was situated in a mining district where some of the mains were necessarily in a bad condition, some were small, and many had been laid for a great number of years. When taking out some of these mains and examining them, it became obvious that they had at times been almost stopped with naphthalene. His system had removed the whole of this, and left only the rust in the mains. At the time when he read the paper, he was under an obligation to the Ministry of Munitions to extract as much benzol as possible; but he had now reduced the amount removed from about 2½ gallons to ¾ gallon per ton of coal. He proposed to work at this figure, because by extracting too much of the illuminating power one would get into discredit. To his mind, a lot of the trouble with consumers had been due to the fact that the gas had looked so much poorer. Of course, they knew that if the whole of the benzol was extracted, the amount of calorific power which one would lose would be comparatively small. He remembered the time when he used to employ very large quantities of benzol for enriching purposes at West Bromwich. For several years running, they used as much as 40,000 gallons a year, because they made a certain proportion of blue water gas, of which they had one of the first plants in the country. When he looked back on this, he thought what an unholy waste it was, because making blue water gas of 300 B.Th U., and using enough benzol to bring it to 16½ candles only added some 16½ p.ct. to the calorific power; so that when they got the public educated to the fact that there might be calorific power without any trace of illuminating power, conditions would be very different. They had not, however, arrived at this state yet; there were still people who persisted in using flat-flame burners. As for himself, he was continuing to extract benzol for the sake of recovering naphthalene primarily, and secondarily because he intended to refine the benzol and put it on the market as motor spirit. It could be very easily done. He had been going into the question lately, and had had a number of quotations for benzol refining plants. The price was enormous; and there was nothing to justify it. There was not a gentleman in the room who could not quite easily improvise a refining plant for all the benzol he was likely to turn-out. It was a very simple process. All it required was a still, or two stills probably, and fractionating columns, which could be easily improvised. The washing process was the simplest thing in the world, and most of them had the washing materials on their works. They had lime and sulphuric acid; and all they had to purchase was caustic soda. This was quite inexpensive; and a very small quantity was necessary. Taking everything into consideration, he maintained that the process he had introduced had been more than justified; and he was perfectly certain that, when he knew a little more about it himself, it would prove to be still more justified.

CHEMICAL ENGINEERING IN MODERN GAS-WORKS.

Mr. TWINE remarked that he did not know that there was much to add to what had appeared in his paper; but he would just like, while the matter was fresh in mind, to make one addition to what Mr. Copp had just said. Mr. Copp had told them that they had got their gas, and could improvise plant and wash it, and so on; but he did not know why he wanted to say that they could buy caustic soda. They had got lime, and could get their soda carbonate much better than they could buy caustic soda. Therefore they should improvise, and make their caustic in this way. All that was needed was a mixing tank. As to his paper, he did want to impress upon them that no one need trouble about the future of the gas and allied industries, if they had the help that was needed. So long as they had good gas engineers, good chemical engineers, and good scientists—more especially physicists—they could hold their own in competition with the electrical people and super-station schemes. He was quite optimistic, so long as they had properly trained men at the head of affairs. He would go further, and say it was his opinion that in the near future, instead of having little gas-works all over the country, they would have larger gas-works pooling, and possessing the chemical works which he had at the back of his mind. Working under such ideal conditions, they—the gas industry—would be the chemical manufacturers of the near future; and it was quite right they should be. They provided the raw material; let them see to it that they made the finished product, and of the best. He firmly believed that, where one wanted sulphuric acid for the manufacture of sulphate of ammonia, one never would have an ideal position while it was necessary to pay carriage for the sulphuric acid over a long distance. If there were central pooling stations, and the acid was made where required, costs must be lower than when there were these high rates of carriage to face.

Experiences at Coventry.

Mr. P. N. Langford (Coventry) said that, with regard to Mr. Copp's paper, he thought they were indebted to him for putting before the members the difficulties which he had encountered when he commenced the process of benzol extraction; and he was certainly to be congratulated upon the successful manner in which he had overcome them. But as to the extraction of naphthalene from the gas, Mr. Copp had apparently succeeded in practically eliminating the naphthalene from the gas which he washed; and this he (the speaker) so far, with the plant with which he had experienoe, had not been able to do. The most that he could attain was an extraction of 50 p.ct., leaving some 3 grains per 100 c.ft. in the gas which was going out into the district. He found, however, that even 3 grains was quite sufficient to give them trouble; and in trying to discover where the difference arose between the method Mr. Copp adopted and that at present in use at Coventry, he could only account for it by the quantity of wash-oil per ton of coal that Mr. Copp was using. The quality of the oil used in the two cases was practically the same; and he would have been glad to hear how much per ton Mr. Copp was employing. They had only used on an average 55 gallons per ton of coal at Coventry; and this was not sufficient to totally eliminate the naphthalene. The point Mr. Copp brought out, and which he (the speaker) could thoroughly endorse, was that it was essential that the heat for driving off the benzol should be imparted, not by means of a supply of live steam, but by heat-interchangers or superheaters; and he was rather inclined to think that the greatest factor working towards the successful use of Mr. Copp's plant was this, rather than the analyzer which he installed between the main condenser and his benzol still. He (Mr. Langford) was hoping he would be as successful as Mr. Copp, because the naphthalene bugbear was certainly not conducive to smooth working. Now with regard to Mr. Twine's paper. He could quite confirm this gentleman's remarks as to the necessity for having their own raw material for working-up the bye-products. As they were all aware, his late chief, Mr. Fletcher W. Stevenson, was a very progressive man in this respect. In 1902, they were experiencing great difficulty in obtaining supplies of sulphuric acid at anything like a reasonable price; and consequently, though they were at the time only making 30 cwt. of sulphate of ammonia per day, Mr. Stevenson decided to put down a sulphuric acid plant. Probably at the time this was the smallest plant in the country, as they could only make just about sufficient to meet their requirements for manufacturing sulphate of ammonia. Since then, however, the plant had been enlarged considerably, and advantage had been taken of the ingenuity of Mr. Twine to instal a system of mechanical furnaces for the burning of the spent oxide; and it was working most satisfactorily. They had had their troubles to start with—principally the one mentioned by Mr. Twine, the question of dust being carried forward. This difficulty had since been overcome by putting in dust chambers. They had also installed contact towers; and for the past twelve months they averaged only 3 p.ct. nitre consumption. Then, again, there was an important point with regard to the treatment of the burnt residue, so that it could be used again for the recovery of sulphuretted hydrogen from the gas. At Coventry, they had prepared the burnt residue in such a manner, and used it in their purifiers, that they had been able easily to work it up to 60 p.ct. Thus in the future there would doubtless be great scope for big undertakings to put up sulphuric acid plants, and supply acid at a much lower figure than they could now obtain it at. One point not mentioned that afternoon in regard to Mr. Twine's paper was the recovery of cyanogen. Birmingham, he knew, had done extraordinarily well in the matter of the extraction of cyanogen from the gas; and he personally was much indebted to them for the great help received in the working of his plant. A point to which he wished to draw attention was, as Mr. Twine had remarked, that one of the greatest secrets of success in the recovery of cyanogen was the introduction of at least 1 to 1¼ p.ct. of free oxygen to the gas. It was rather a large figure, and entailed approximately 6 p.ct. of air, but he could quite see that it would be advantageous. Perhaps one reason why he himself was not getting such good results as Birmingham, was that the gas at Coventry was not tar-free to the same extent as in Birmingham. He would like to inquire of Mr. Twine which he considered was the best method of tar extraction. He had put in a "P. and A." extractor; but he would as soon be without it, for the results obtained.

Mr. Twine thought that Mr. Chaney would bear him out that at one of his works they were extracting certainly not less than from 95 to 98 p.ct. of the total cyanogen in his gas; and it was absolutely because of the fact that they had reduced the tar down to a mere trace. On the other hand, they had a works at which they could not reduce the tar down below 5 or 6 grains per 100 c.ft.; and there it was impossible to get more than 92 p.ct. On the same works, when they could not get this particular gas down below 7 or 8 grains (it even went up to 10 grains), he could never guarantee Mr. Chaney a result above 85 p.ct. So that the elimination of the tar was absolutely essential. If they asked him which was the best method to adopt to this end, he could not say, because they had these problems to-day, even after all the years' experience. The "P. and A." would sometimes do it entirely; and at others they could not "work the oracle" with it. He thought with the temperature kept just right and a slow travel of the gas, the tar could be got down certainly below 3 grains.

A Vote of Thanks.

The President said he was sure both Mr. Copp and Mr. Twine had afforded much valuable information to the industry generally, not only by their papers, but also by the remarks made that afternoon. There were not many of them who were in a position to criticize these papers; and he was gratified that Mr. Langford had come along and made his "maiden speech" to the Midland Association. They would hope to hear him on many more occasions. He proposed a hearty vote of thanks to the authors.

Mr. R. S. Ramsden (Leamington) seconded, because, as he said, it gave him the first opportunity he had had of giving public expression to the very great debt he was under, when at Burton-on-Trent, to Mr. Copp for the valuable assistance he had given him—first by the visit of the Association to his benzol plant at Etruria, and subsequently by advising him personally on points to be looked after in the erection of the Burton benzol plant. The paper and the additional particulars given that day were further evidence of Mr. Copp's desire to help his brother engineers and the gas industry generally.

Those present then adjourned to another room for tea with the President.

ECONOMIC FACTORS RELATING TO COAL SUPPLY.

Summarized Report of the First of a Series of Cantor Lectures by Professor W. A. Bone.

A series of three Cantor Lectures for the present session at the Royal Society of Arts are being delivered by Professor W. A. Bone, D.Sc., Ph.D., F.R.S. The subject of "Coal and its Conservation" is one of supreme importance to all consumers—industrial particularly—in these critical times, as the lecturer showed in the first deliverance yesterday week. Coal being the chief raw material of the gas industry, and the expenditure on it the major one in the revenue account, information bearing upon its economic position is of large interest to our readers. Nevertheless, we shall have to confine to an abstract the report of the lecture, which was largely given extemporaneously.

All-Important Economic Aspects.

In his opening, Prof. Bone remarked that Old King Cole is a hard task-master. Of late, his majesty has become very truculent. He is out to show us that he rules, and that we mere mortals will have to accommodate ourselves to his behests. He is now issuing his demands even from the Robing Room of the House of Lords. The possibilities of what some of these behests might mean to us as a nation supplied the theme for this lecture. Coal is from every point of view, as the lecturer said, a most fascinating study whether regarded geologically, chemically, economically, socially, or even, as in these days, politically. In this lecture, however, Prof. Bone proposed to confine his attention to those aspects of the subject which seemed to matter most at this juncture in our national affairs. He was not going to speak upon the chemistry or the origin of coal, but rather he wished to deal with certain economic, or *quasi*-economic, aspects of the coal question which appear to demand the attention of intelligent people, whose prosperity depends upon the correct handling of some of these great scientific and economic questions. He invited those present to consider certain of the economic or politico-economic aspects of the question in relation to the immediate future, and to the new position created by the war, in order to point out what seemed to him to be one or two arresting features which, at our peril as a nation, we ignore. The subject is to-day one of such importance that every intelligent citizen must try and form as best he can opinions about the coal question, because unless we resolve the coal situation in a manner consistent with the maintenance of our national economy and stability, there is no doubt that the coal question will ultimately resolve us.

Our Former Coal and Marine Supremacy.

All will agree that coal is a commodity essential to the life of a civilized community such as ours. Equally with the air we breathe, the food we eat, the clothes we wear, it is a fundamental necessity of modern civilization. When Jevons endeavoured more than fifty years ago to awaken public opinion to the vital importance of coal to the industrial future of the kingdom, it held an unrivalled position as a producer of coal. For out of the world's total output of 130 million tons, no less than 80 millions, or 60 p.ct., were raised in Great Britain. The then known immense coal reserves of North America, as well as those of the States until lately comprising the German Empire, had scarcely been touched. The proximity of all our principal coalfields either to the sea on the one hand, or to supplies of ironstone on the other, combined with the natural skill and aptitude of our people in regard to mechanical inventions, had combined to place us in a position of unique advantage over all the other countries. "The strength of Britain," as George Stephenson used to say, "lies in her iron and coal beds. . . . The Lord Chancellor now sits upon a bag of wool; but wool has long since ceased to be emblematical of the staple commodity of England. He ought to sit upon a bag of coal." Our unrivalled position in regard to the coal trade of the world as a whole had not been seriously affected until the outbreak of war. The war has considerably altered the position. If it be true that the world power of the British Empire is due to the supremacy of its mercantile marine, which ultimately depends upon the ability of the kingdom to build ships more cheaply than any foreign rival, it may with confidence be asserted that the unchallengeable position which we had attained before the war was bound up with our abundant supplies of cheap coal and iron, combined with our favourable geographical position, climatic conditions, low nominal wages, and also, as the lecturer thought, our policy of free imports. He believes it will also be agreed that our supremacy at sea is absolutely vital to the maintenance of what is sometimes called the British Empire, or as he would prefer to call it the British Confederation. A writer in the current "Edinburgh Review" truly observes: "Whenever the United States, or any other nation, is our equal, still more when it is our superior, on the sea, the British

Empire will have lost its place in the world." This supremacy we have easily held during the last fifty years, because in no country in the world could ocean-going ships be built as cheaply as in this kingdom. Prof. Bone having been born, bred, and reared in a North-East Coast shipbuilding town, is in a position to say, from his own knowledge of the economic conditions prevailing in the shipbuilding industry, that up to the outbreak of the war no other nation could build ocean-going ships as cheaply as we could on the North-East Coast or the Clyde. We shall inevitably lose this position as soon as changing economic conditions make it possible to build ships more cheaply elsewhere. The writer in the "Edinburgh Review" also remarks that the fact that we are left at the conclusion of the war "with a gravely diminished merchant shipping . . . is the shadow which dims the splendour of our victory."

The Situation after the War, and the Need for Real Economy.

To any reflecting mind, it must be clear that the catastrophe which overwhelmed Europe in August, 1914, has seriously undermined our economic position, and that the situation with which, after four-and-a-half years of reckless inflation and prodigality, we are now faced is unexpectedly grave, threatening as it does our competence to recover from the wastage and demoralization of war even a small measure of our former prosperity. In order to finance the war, we have mortgaged—deliberately mortgaged—our capital so heavily that the war debt now stands at almost half the estimated value of the accumulated wealth of the country in 1913—viz., at about £180 per head of the population. It is no doubt true that for the most part, "we owe it to ourselves." But all the same the fact remains that the credit and material resources of the country have been unproductively expended at an appalling rate during the last four-and-a-half years; and the inflation of its currency is an index of the consequent impoverishment of its producers. This inflation has now reached a point which is a menace to our foreign trade and world power. It is imperative that no section of the community should any longer remain under the delusion as to what the situation really is, and that all classes should be made to understand that the only possible way to retrieve it is to work more, spend less, and, once and for all, get rid of the false and perilous notion that it is possible to pass immediately from the "Hell of War" into an "Earthly Paradise." In the grave times that are ahead of us, every possible real economy will have to be exercised, and all unproductive public expenditure be ruthlessly curtailed. Every scheme of reconstruction must be judged by what it can be guaranteed to achieve in the way of economy. Reforms, however desirable, which are not likely to be immediately productive, must be postponed; for we have no business to add to the public burdens by embarking upon doubtful enterprises merely because they will increase the amenities of life for the working classes, or provide more opportunities for whiling-away more pleasantly their ever-increasing hours of leisure.

Relatively Cheap Coal Necessary to the Importation of Raw Materials for Industry.

The central and basic fact of our economic position is that (owing to our abundant supplies of cheap coal and iron ores, and their proximity to the sea) we have been able to build-up and maintain a maritime supremacy which, alone, has enabled us to import the numerous raw materials requisite for carrying-on our largely developed industrial system. We are not—and here we differ entirely from the United States—naturally endowed with the capacity to produce in quantity sufficient for the needs of a modern industrial community a great variety of raw materials, nor can we grow sufficient food for our present working population. But our ships bring abundance of both food and raw materials from all parts of the world to our coast, and, without the impelling power of relatively cheap coal, we should neither be able to attract the raw materials, nor yet build or maintain the ships in which to convey them. Relatively cheap coal and power are the keystone of the whole economic structure. So long as we can produce relatively cheap coal, then because of our geographical position, our trade connections, and our long experience in trade and commerce, the raw materials will be attracted here. On the other hand, if we lose the attractive power of relatively cheap coal, the magnetism will begin to go, and ultimately we shall lose it altogether.

Hence Prof. Bone considers the coal situation in the light of what he believes to be the central and basic fact of our economic position. Of all the important raw materials produced in this country for our great textile and engineering industries, coal is the only important one yielded in excess of our own requirements. For instance, in the year before the war [1913], out of a total output of 287½ million tons of coal, we exported about one-third, and the remainder was retained for our own consumption. Of iron, we produce the major part of our requirements. Of our total production of 10¼ million tons of pig iron, half only was smelted from British ores, the other half from imported ones. We also imported considerable amounts of iron and steel blooms, ingots, billets, &c., though not a large proportion of the total required. Of the other materials needed, we imported 100 p.ct. of the copper, 90 p.ct. of the lead, 95 p.ct. of the zinc, something like 80 p.ct. of the sheep's wool, and all the raw cotton. The lecturer did not know what the percentage of imported timber was; but the total amount imported was no less than 338,669 tons. These figures show how much our great industries are dependent upon our importing power. In 1913, we imported food, drink, and tobacco, to the amount of 258 millions sterling, and raw materials and unmanufactured articles, including metal, to the extent of 230 millions sterling, or a total of 488 millions sterling. Whence (it may be asked) do we derive this importing power which is essential to the maintenance of our industrial system? The answer is (*a*) from the exports of coal and manufactured products, (*b*) from the earnings of ships, and (*c*) from interest on foreign investments, bankers' and merchants' commissions, &c.

All this means that we were freely exchanging with the outside world the products of British labour (either present or past) for the food and raw materials requisite for its maintenance, and that the chief factors which make such exchange possible are cheap coal and low nominal wages, both of which ultimately depend upon cheap food. For the time being, our export trade has been heavily hit, and consequently that part of our importing power derived from it has been seriously diminished. Our export trade to neutral countries can be made good if conditions allow. Also during the war our mercantile marine lost much more tonnage than did the rest of the world. Our net losses were 3,443,012 tons, compared with 1,811,584 tons for the remainder of the world. Until this adverse balance of lost tonnage can be made up, the earnings of our ships will relatively not be so great as formerly; and in future it depends very much upon coal whether we can build our ships relatively more cheaply than can America. Ship building to-day in this country is very costly. We used to build ships on the North-East Coast before the war at about £7 per ton dead-weight carrying capacity; if we can build these ships to-day for £30 per ton dead-weight it is as much as we can do. Cheap ships depend upon relatively cheap steel and coal.

Dear Food and Cheap Coal an Impossibility.

Having dealt with the financial position in which the country finds itself at the close of the war, Prof. Bone asked, "What is going to be the effect of the situation left by the war upon the relative prices of coal in this country." The cost of getting coal is largely a question of the cost of wages of the miners, and this again is largely a question of the cost of food. It is not unreasonable for any body of men who have to do hard physical work to ask to be recompensed for the increase in the cost of living. Therefore, any policy which aims at creating or maintaining high prices of food, in the supposed interests of the agricultural community, must inevitably mean high nominal wages and dear coal, both of which will assuredly diminish our importing power, and ultimately ruin our industrial system. Indeed, in this country we cannot at the same time have dear food and cheap coal; and without the latter our industrial system cannot long be maintained. The lecturer deprecated a continuance of the policy of paying "subsidies" to farmers under the "Corn Production Act," and said that unless free importations of foodstuff at "world-prices" were soon re-established, the position that is developing as the result of the Coal Commission will involve before long a demand for a subsidy from the manufacturers of iron and steel; and this will mean subsidies all round. In Prof. Bone's opinion a policy of subsidies is a policy of despair; and in a country such as ours which, before the war, had reached the meridian of its industrial development, it would not, on a system of "subsidies" all round, be possible to continue development into a ripe and vigorous old age. Development would be prematurely arrested, and senility rapidly set in.

No Alternatives to Coal for this Country.

The seriousness of the present situation of the country is that there is no real alternative to coal as a source of heat and power on any large scale. It has recently been estimated that so far as Great Britain (excluding Ireland) is concerned, the total available water power is not capable of generating more than about 1 million B.H.P. (or only about 8 p.ct. of our present requirements); and of this only about 8 p.ct. is actually being utilized. As regards Ireland, it has been stated that the amount of water power available is probably quite considerable, but without much closer investigations than have yet been made, even an approximate estimate cannot be given. Here, again, North America (which contains nearly 70 p.ct. of the world's total coal reserves) is wonderfully endowed by Nature. In the United States there is available in water power 28 million B.H.P., and in Canada 27 millions—a total of 55 millions. But in the United States, only 7 millions, or 25 p.ct., have been developed; in Canada only 3·5 millions, or 13 p.ct.

The World's Coal Reserves and Requirements.

Having touched upon peat, which cannot at present be regarded as having more than local importance, Prof. Bone reviewed the world's coal reserves and requirements. The estimate of the reserves in the whole world in 1913 was 7,397,553 million tons. A recent survey of the geographical distribution of the estimated reserves has shown that no less than 69 p.ct. of the total is located in America (almost wholly North America), 17·3 p.ct. in Asia, 10·6 p.ct. in Europe, 2·4 p.ct. in Oceania, and only 0·6 p.ct. in Africa. Of the total reserves, 51·8 p.ct. are in the United States, 16·4 p.ct. in Canada, 13·5 p.ct. in China, 5·7 p.ct. in Germany, 2·6 p.ct. in Great Britain, 2·3 p.ct. in Siberia, 2·2 p.ct. in Australia, and 0·8 p.ct. in Russia. Probably China's reserves have been considerably under-estimated; and they are known to be of the highest grade. It is not generally realized by the people of this country that the United States (our future greatest competitor in the world's markets) possesses not less than

one-half, and Great Britain not more than one-fortieth, of the world's total reserves. After making due allowance for the fact that, whereas our reserves consist wholly of high-grade anthracite and bituminous classes, while half those of the States comprises inferior brown coals and lignite, it still remains that, per head of the present population, the United States possesses between six and eight times as much coal fuel as we do. We, however, possess two important natural advantages—viz., our geographical position, and the proximity of our best coalfields to our ports.

The lecturer then took us through a large number of other statistics. It was seen how rapidly the world's demands for coal are increasing, how before the war the production of the United States was increasing at the rate of 6 p.ct. compound interest, while ours was increasing at 2 p.ct., and Germany at 4 p.ct., compound interest. In this, however, there is nothing for this country to be alarmed at. Having regard to our more limited resources, our coal trade was before the war in a very prosperous condition; and we could produce coal for the European markets relatively as cheaply as Germany could do. Some people regard the exportation of coal as a great mistake. But the lecturer holds that a large export trade in coal is a basic necessity of a mercantile marine supremacy; and also it is a large factor in the importing power which is so very necessary for the maintenance of our industries. It would not be wise (especially after the war) for this country to impose upon the coal trade any export restrictions—the more coal we export after the war the better for some time to come. Before the war, the export trade of America was chiefly landward; and Germany sent coal by land into Russia and other countries over her frontiers; while this country was transacting, wonderful to relate, some 70 p.ct. of the whole of the overseas coal trade of the world. We exported coal on the average at higher prices than those at which we supplied ourselves, and as most of it was carried out in our own ships, we were able in this way to pay for a corresponding proportion of the raw materials that were brought back.

Production of Coal per Man—America's Big Lead.

Prof. Bone said he should like to call Mr. Smillie's attention to some figures. The thing which causes the lecturer most misgiving about the coal situation is that in America, owing to shallow depths and thicker seams, with the greater employment of machinery, the annual outputs per man are increasing very rapidly, whereas ours are going down. In the triennial period 1905-7, the production per person employed above and below ground in American (U.S.) mines was 589 tons, and in Great Britain only 289 tons; in 1908-10, the figures were respectively 591 tons and 265 tons; and in 1911-13, 651 tons and 254 tons. The German output per man had been going up before the war. The steadily diminishing outputs per person employed in British mines (which had marked the past 35 years) was a serious feature which seemed to call for some explanation on the part of the miners' leaders. Perhaps they would supply it before the Commission concluded its work.

Rise in Pit-head Prices.

The next figures to which Prof. Bone called attention were the average pre-war pit-head prices in Great Britain. They were (taking decennial periods):

	Per Ton.	
1865-74	5s. 11d.	
1875-84	6 10	
1885-94	6 3	Increase in thirty years = 37½ p.ct.
1895-1904. . . .	7 5	
1905-1914. . . .	8 7	

Taking the last four years, the average pit-head prices were:

1915. . . .	12s. 5½d.	1917. . . .	16s. 8¾d.
1916. . . .	15 7½	1918. . . .	22 0

The corresponding price to-day is probably about 25s. per ton; so that it may be said that the pit-head price of coal has probably quadrupled within the period in question.

These data were succeeded by other tables thrown on the screen, showing average pre-war values for exported coal, and the average pre-war values of coal in America. The comparison made was not to the advantage of this country; prices had not advanced in America in the same proportion as here. But regarding the increase in the price of coal before the war, Prof. Bone pointed out that it had been going up so slowly that it was not much felt. Inasmuch as it had been gradual over a period of thirty years it had been largely counteracted by economies effected in consumption. And so long as such counteraction would be effective in keeping down manufacturing costs as a whole public opinion, as well as economic pressure, would compel manufacturers to apply the obvious remedies. But anything like trebling pit-head coal prices (which was threatened) as between 1913 and 1919 could not be so remedied.

From the Concluding Remarks.

In remarks accompanying other data, Prof. Bone said that we had tried to control King Cole; but he was afraid we must admit from the evidence before the Coal Commission that he had rather got the better of us. He had had it from a well-known member of his majesty's household that, if colliery officials and managers had not been hampered by vexatious interference and restrictions, and multitudes of forms and returns, there would have been a much larger output of coal, and it would have cost 4s. to 6s. less per ton. Gas consumers, too, must not complain over the price of gas having gone up. In view of the advance in the price of coal, the advance in the charge for gas has not been at all unreasonable. Gas shareholders would much rather go back to pre-war conditions than remain where they are now. The South Metropolitan Gas Company had to pay for coal delivered at the works in 1913, 16s. 7½d. per ton, in 1918 39s. 2d. "We are," said the lecturer, in conclusion, "living in an age when world power depends upon the relatively cheap production of coal and iron. A nation that deliberately throws away or diminishes its advantages over others in this respect is, economically speaking, digging its own grave."

The second of the series of lectures was given yesterday afternoon; and the final one will be delivered next Monday.

SCOTTISH JUNIOR GAS ASSOCIATION.

Joint Visit to the Stirling Gas-Works.

The joint visit which had been arranged to take place between the Western and Eastern Branches of the Scottish Junior Gas Association was carried out on Saturday afternoon last, when a party of over fifty members accepted the invitation of the Stirling Gas Light Company to be shown over their gas-works.

The Works Described.

The works have been in existence since the early part of last century, and are the property of one of only four incorporated companies in Scotland; having been incorporated by an Act of Parliament in 1898, after negotiations for the sale of the works to the Town Council of the Royal Burgh had fallen through the previous year. Since that time practically the whole of the plant has been renewed—two small gasholders forming the only remaining parts of it then existing.

The visitors were conducted over the works by Mr. J. M. Smith, the Gas Engineer and Manager, and his assistant. A large number of those present who were more familiar with the vertical retort system, were greatly interested in the opportunity given for seeing the working of horizontal retorts, with combined charging and discharging machinery. Special attention was drawn to the method adopted in some of the retorts of continuous steaming, which is here being experimented with. The working was fully explained, and Mr. Smith stated that they entertained firm hopes of the process being quite satisfactory. Atmospheric condensers are used for cooling the gas; connections being made for passing the gas through the condensers in six different ways. The method of changing the flow has been found to greatly eliminate naphthalene troubles in the distributing mains.

The present maximum make of the plant is about 800,000 c.ft. per day, although capable of producing one million per day. The charging and discharging machines, the coal breaker, elevator, and conveyor, and the coke elevator are driven by electricity generated by a 45 H.P. gas-engine, costing 1d. per hour to run. The works are admirably situated alongside the Caledonian Railway system, in a district from which excellent coking coal can be mined, and supplied copiously with water free of expense. Since 1899, the make of gas has steadily risen from 60 million c.ft. per annum in that year to 158 millions in 1918, owing, in large measure, to the development and increased use of cooking and heating appliances. When the Company were first incorporated, the price of gas was 3s. 4d. per 1000 c.ft.; in 1901, it was 3s. 9d.; but from that year it was gradually reduced till it reached the minimum of 2s. 6d. in 1909, and remained at this figure till 1914. In 1915, it rose to 3s. 2d., and went up gradually till it reached 3s. 10d. last year.

Much interest was taken in the subsequent stages of gas manufacture, and especially in the crude benzol plant, which has been working for the last few years. Part of the rotary scrubber has been used for washing the oil for this purpose. The plant produced about two gallons of crude benzol per ton of coal. One of the gasholders stands on ground on the other side of the railway—the Company having, with commendable foresight, purchased a site there where a large new works may be erected when this becomes necessary.

The Guests of the Company.

At the invitation of the Company, the members were afterwards entertained to tea in the Waverley Temperance Hotel.

Mr. Forsyth, the Chairman of the Company, presided. In welcoming the members, he said they felt that the gas industry was under a cloud at the present time, being hedged round by the restricted scale of charges on the one hand and by the increased oncost charges on the other. They felt that it would only be fair that, if these oncost charges were to rise, they should be borne by the public for whom the commodity was produced.

Mr. T. Moffat, the President of the Western District, and Mr. R. Waddell, the President of the Eastern District, expressed the thanks of the members to the Company for their hospitality.

Owing to an important emergency engagement, Mr. E. W. Smith, D.Sc., was prevented last Thursday from giving his lecture on "Gas Quality" to the Midland Junior Gas Association. The meeting was therefore abandoned, and the lecture will be delivered at a later date.

CORRESPONDENCE.

[*We are not responsible for opinions expressed by Correspondents.*]

Gas Officials' Present-Day Superannuation Allowances.

SIR,—We have now read, or listened to, most of the addresses bi-annually delivered to the proprietors by the chairmen at the meetings of the more important gas undertakings; we have had light shed on good work accomplished; we have been constrained to note how, in the face of well-nigh insuperable difficulties, things have been kept going; we have been given figures proving the vast increase of working costs, showing the tremendous up-bound of the weekly pay sheet, with murmurs of bonuses to staff officers designed to solve in part the problem of how, in these days, to be happy though living; we have been told of the basic aid supplied to the Government in the shape of benzol, toluol, and a host of other "ols;" and we have heard the just plaint of the shareholder that the legislature should appraise these services at 3 p.c. "Well, well, times are bad; but we have done our duty *N'est-ce pas?*"

Not quite. Among the speeches has there been one mention of that small body of men whose work forms part of the speakers' heritage? Has any shareholder risen in his place to ask what had been done for the men whose labours in the past had given him his seat in the present gathering? No; some votes of thanks and they are gone—leaving the weight of present economic conditions weighing as heavily as before on the shoulders of the annuitant.

And this weight, mark you, is the heavier from the fact that a gas company's allowance on superannuation is not at the usual two-thirds rate of important corporations, but is limited to one-half of the retiring salary. So that, in the case of an officer whose retirement halves his income, he who was formerly in receipt of (say) £400 per annum has now—the present value of the sovereign being about 8s. 9d.—to support himself and his dependents on £90 a year! This pension scale (none too generous at any time), when fixed, was at least accounted with some sort of correlation to existing values—values that are now as obsolete as a last year's Dreadnought and, thanks to a "Snowball" Government, who raised-the-wages-that-raised-the-prices-that-raised-the-wages-that-raised-the-prices, and so on, in vicious and ever-swelling sphere, will never return. All this has been recognized in the case of the salaried staff; yet have the boards of directors done nothing the while to readjust the annuity scale even in the same spirit as has been shown to the workmen—those workmen who now demand "another ten bob and will see they get it."

No, the lot of the gas company's annuitant is like that of Gilbert's policeman—not a happy one. He is never mentioned; nothing is done for him who has served; all is heaped on those who are serving. Yet where would the server be, had it not been for him who has served? So in the days when he hoped to be resting, he has maybe to seek work again in desperate effort to keep from his door the wolf that will be always lurking round the corner.

This then the appeal of the gas annuitant. As has been done to the others, let there be done unto me?

BLIX.

London, March 10, 1919.

Financial Hardships.

SIR,—Now that commissions of enquiry, conferences, &c., are *au fait*, why should not the National Gas Council demand a Government Commission of Enquiry, to go into the whole circumstances of the gas industry now as compared with pre-war times, and let us have some sort of British fair-play? It would, without a doubt, be found that the position of matters amply warranted such an enquiry—and a remedy.

March 11, 1919. E. L. L.

PARLIAMENTARY INTELLIGENCE.

HOUSE OF COMMONS.

Dutch and German Coal Imports.

Mr. BRIDGEMAN, the Parliamentary Secretary to the Board of Trade, in reply to a question by Mr. Gilbert, addressed to the President of the Board of Trade, said that the quantities of coal imported into the United Kingdom from Holland and Germany in the years 1912, 1913, and 1914 were as follows: From the Netherlands, 2695, 46, and 8620 tons respectively; from Germany, 69,297, 6683, and 27,073 tons. So far as he had been able to ascertain, the principal importers were a gas company on the South Coast and certain London coal merchants.

Gas Coke Price Order, 1918.

Mr. BRIDGEMAN, replying to Major Prescott, who asked the President of the Board of Trade if he would give the result of the Gas Coke Price Order, 1918, and its effect upon household coal consumption, said that the Order referred to related to industrial coke, and did not affect household coal at all.

Public Lighting.

Major PRESCOTT asked the President of the Board of Trade if he would consider the need for an inquiry into the rates charged for the supply of public lighting by public undertakings as compared with private undertakings, and also as to the standardizing of lighting, particularly in London and Greater London, with a view to the prevention of the use of high units of light, extravagant in point of finance, and unnecessary and damaging to the eyesight.

Mr. BRIDGEMAN (the Parliamentary Secretary to the Board of Trade), who replied, said he did not think that any useful purpose would be served by an inquiry into the matter referred to in the first part of the question. Regarding the second part of the question, he referred to his written reply to Major Prescott's question on March 4.

MISCELLANEOUS NEWS.

THE COAL INDUSTRY COMMISSION.

EVIDENCE FROM THE GAS INDUSTRY.

Sir JOHN SANKEY in the chair.

At the sitting of the Commission on Monday of last week, Mr. DAVID MILNE WATSON was called, and gave the following evidence:

I am the President of the National Gas Council and Governor of the Gas Light and Coke Company. Taking the last figures published by the Board of Trade—namely, those in 1915, of a total of 831 authorized gas undertakings in the United Kingdom, 519 are owned by companies and 312 are owned by local authorities—representing a total capital of some £140,000,000. In addition, there are about 800 non-statutory gas undertakings. Of the 8,000,000 consumers supplied with gas by the various undertakings in the Kingdom, 4,250,000 families are supplied by slot-meters—that is to say, they are very largely working-class families. The National Gas Council is a Council representative of the gas undertakings in the United Kingdom, whether municipally or company owned. Undertakings making 82 p.ct. of the total annual make of gas of the United Kingdom are represented on the Council. The total annual make of gas for the United Kingdom is 250,000 million cubic feet. The amount of coal dealt with by gas undertakings annually may be taken as 20 million tons. Apart from supplying gas for public, industrial, and domestic lighting, industrial and commercial heating, and commercial and domestic cooking, the undertakings supply a large quantity of gas for industrial power purposes. There are more than 300 methods of applying gas to industrial processes, and over 2700 trades in which gas is used in some one or more such processes—annealing, brazing, hardening, tempering, melting, &c.

After the carbonization of a ton of coal, nearly 13 cwt. of coke are left. In other words, in addition to producing 250,000 million cubic feet of gas, which may be used for light, heat, or power, the gas undertakings also produce 13 million tons of coke. In the process of converting the coal into gas, 70 p.ct. of the heat of the coal is conserved for the community; whereas when coal is burned under boilers for generating steam, only 12 p.ct. of the heat is conserved, and the coal is absolutely destroyed. The undertakings also produce valuable chemical bye-products—such as tar, pitch, creosote, carbolic, sulphate of ammonia (required as a fertilizer), benzol (used for the production of dyes and as a motor spirit), and cyanides. These chemicals are a great national asset, forming the raw materials of many industries.

The price of coal is one of the principal factors determining the price at which gas can be sold. An advance of 1s. per ton in the price of coal means, on the average, an advance of ½d. in the price of gas, after giving credit for a corresponding rise in the price of coke. On the total quantity of gas sold, it means an increase of £500,000 per annum to the consumers for every 1s. advance in price. Since the war broke out, the price of coal f.o.b. has advanced by 10s. 6d. per ton (13s. in South Wales, Forest of Dean, &c.), involving an extra cost of £10,500,000 per annum. The receipts from residuals have not advanced sufficiently to cover the whole of this extra expenditure, or anything like it. In order to meet this great increase in the cost of coal, the price of gas has had to be raised very considerably. The gas consumer is not the only person who suffers by this increase in price; the shareholder suffers also. Many gas companies work under a sliding-scale, which provides that the dividend shall be increased over a "standard" dividend when the price of gas is reduced below a stated figure, and *vice versâ*—the dividend being reduced when the price of gas is raised. There is thus a partnership of interest between the consumer and the shareholder. To give an illustration: Take a company with a standard price of gas of 3s. 4d., a dividend of 4 p.ct., and with a sliding-scale of 2s. 6d. in dividend for every 1d. rise or fall in the price of gas. In such a company, when the price goes up to 4s., the dividend would become 3 p.ct.; whereas if the price went down to 2s. 8d. the dividend would be 5 p.ct. Other companies are known as maximum-price companies, and may pay a dividend up to a fixed maximum, and must not exceed a certain fixed price for gas. For example, a maximum company whose maximum dividend is 5 p.ct., and whose maximum price is 3s. 6d., cannot charge more than 3s. 6d., nor can they divide more than 5 p.ct. A municipal undertaking usually has a maximum price for gas, above which they may not charge. It will thus be seen that the gas industry is different from other industries; that it cannot advance its price to maintain its dividends. Owing to the enormous increase in the price of raw materials and labour, gas companies have been obliged to increase their price considerably; and dividends generally have decreased accordingly.

Last session an Act, entitled the Statutory Undertakings (Temporary Increase of Charges) Act, was passed, whereby gas undertakings, whether municipal or company, are able to obtain Orders, if municipal, from the Local Government Board, or, if companies, from the Board of Trade, allowing—in the case of municipalities and maximum-price companies—an extension of the maximum prices of gas, and in the case of sliding-scale companies a price sufficient to enable them to pay three-quarters of the standard dividend or three-quarters of the pre-war dividend, whichever was the smaller. This has, no doubt, resulted in preventing the dividend of a large number of companies from altogether disappearing. But it allows a dividend in many cases of only 3 p.ct. or less, which is quite inadequate at the present time, when the State is borrowing at the rate of 5 p.ct. This makes it practically impossible to raise ordinary capital for gas undertakings, except on a basis of receiving considerably less than £100 for a nominal amount of £100 of stock. The effect of issuing stock below par is that the undertaking becomes over-capitalized. In addition to the statutory gas undertakings given above, there are some 800 non-statutory undertakings in the country; and I am informed that many of the small companies are running at a loss, which will in the end involve the closing-down of their businesses.

The experience of Government control has not been satisfactory to the gas industry. As is now known, the price of coal was raised

2s. 6d. without any necessity—thus involving, since that charge was made in 1918, an unnecessary charge to gas undertakings of over £1,500,000. Incidentally, in Wales an extra price of 2s. 6d. was charged in 1916; and this extra charge in Wales has never been properly explained. The gas undertakings in Wales were thereby seriously handicapped. The Government, when they made the increase of 2s. 6d. per ton in 1917, did what no private owner could have done—namely, they made it retrospective. When the price was raised on Oct. 12 by 2s. 6d., the gas undertakings were made to pay the increase from a previous date—namely, Sept. 17. Furthermore, the Government insisted that the increase should be paid on all arrears. This is absolutely wrong in principle, and opposed to all that is best in business; inasmuch as it was giving a premium to coal contractors who had not carried out their contract and had got into arrear with their deliveries. If the business world were to adopt such principles, it would be subversive of all business morality, seeing that on a rising market it would become the direct interest of the contractor to delay deliveries in order to obtain the higher price which he thought or hoped was coming. Even recognizing the difficulties occasioned by the war, the Government's distribution scheme did not work satisfactorily. There was sent to gas undertakings coal which was totally unsuitable for gas-making. For example, they sent some coal to London containing 30 p.ct. of ash. In other words, out of every three wagons of such coal sent to London, one was a wagonful of stone and dirt; and there was waste, therefore, in haulage, wagons, and labour. Such coal sent to gas-works is not only useless in itself, but by producing unsuitable coke for fuel, it renders it impossible to get the best out of the coal that follows it in the retorts. Coal has been diverted from one gas undertaking to another without having regard to the suitability of the coal or to the expense of carriage. Inferior coal was sent long distances, whereas only good coal should have been sent the long distances. It is an obvious business principle that if one has to carry anything a long way, only the best should be carried. This fact did not seem to be grasped by the Government.

By Mr. Forgie: On a return to a normal state of things, he would prefer that gas companies should be allowed to obtain their coal from wherever it suited them best. In this respect he was against the establishment of any central authority. Gas companies had worked for a long time under a form of Government audit; and this, he thought, had been an advantage. In dealing with a commodity like coal, it might be well to leave the carrying on of the business to individuals; but there might be a Government audit as in the case of gas undertakings. If the Government assumed control of the coal trade, it was probable that they would not give as much consideration to the quality of the coal for the gas companies as they would wish. He thought it would be a good thing to leave the coal trade free from nationalization.

By Mr. Sidney Webb: The sliding-scale with gas companies had up to now worked very satisfactorily; but during the war, the sliding-scale having been fixed on pre-war conditions, had told very harshly on the companies. There ought to be elasticity with regard to the sliding-scale. The sliding-scale was fixed by Act of Parliament; and all the circumstances were taken into consideration when the standard dividend was fixed. If the nominal capitalization was taken into consideration, the dividend was adjusted to meet the circumstances; but it could not be adjusted without knowing what the capital was at the particular moment. An enterprise under the sliding-scale came under the strictest financial control.

By Sir Arthur Duckham: He was interested in the great question of the conservation of the fuel of this country. He had simply in his evidence tried to bring out the fact that gas could deliver to the consumer something like 70 p.ct. of the heat units in the coal. No other process was known to deliver so much. Electricity only delivered from 12 to 13 p.ct. An article by Prof. Cobb in a recent issue of the "Edinburgh Review" stated this point clearly. With regard to the delivery of heat units, there was a great advantage, therefore, on the side of gas. With reference to the manufacture of fuel-oil by the carbonization of coal for steam vessels, motor cars, &c., creosote could be used, and was used very largely indeed. If it was mixed, it could be made available for any kind of fuel purposes; and even unmixed it was usable for ordinary work. For use in the Navy, it had to be mixed, owing to the low funnels of the boats. The loss of efficiency on the present method of transport of coal was very heavy. He had got from a gentleman in a gas-works the statement that he was at one time working 209 retorts; and to produce the same amount of gas now he had to work 280 retorts, or an increase of nearly 30 p.ct. A great deal of the coal which had been coming down to London had contained 34, 28, 27, 33, 28, 24, 28 p.ct. of ash. This arose simply from the coal not having been properly cleaned during the war. Most coals had not been properly cleaned during the war; and it was quite understood why this was so; but this was coal which was totally unsuitable for gas making. Such coal had been taken all over the country and delivered to works where it very much interfered with the making of gas, and so ultimately raised the price. He thought his position as Governor of a large company's undertaking, and responsible for the efficiency of the undertaking, would be made exceedingly difficult if there were unity of control of the whole coal market and the transport of the coal. During the war it had been found impossible to approach a Government department in trying to get them to be reasonable on a matter of this kind. They might point out that a coal was unsuited for their works; but they were simply met with the statement, "You must take it; you have no power of choice whatsoever." The result had been that it was always very difficult to get any sympathy with one's troubles. For example, bunker coal had been supplied by the contractor at the same price as gas coal. When the Government got control, they put up the price of bunker coal. Their safeguard at the present time was competition. If a man did not serve them well, they could change-over to another man, and in this way get efficiency of working. There had been a tremendous rise in shipping freights since the Government had taken over the control. It had been very difficult to get the Government to listen to reason with regard to the best coal to use. They were always met by the answer that it could not be helped—they must take the coal. It cost exactly the same to carry a ton of the best coal, from which a good deal of gas could be obtained, as a ton of rubbish. As an instance of the difficulties met with, he had been told by a gas manager that he had been in the habit of getting coal from a pit just outside his works, and were running plant which had been laid out to use this particular coal. When the Government took over the coal control, they were forced to use coal from another part of the country, which was quite unsuited for their works, besides which they had to pay a great deal more for it.

By Sir Leo Chiozza Money: He was aware that, owing to the exigencies of the war, a great deal of railway plant, locomotives, and wagons had been sent to the Continent: and he should not say that what he had been complaining of was all a direct result of this. He recognized that the Coal Controller had to divide the country into districts and zones in order to insure that there should be a supply of coal to every part. Notwithstanding this, however, he did not think that his complaints were unreasonable. Recognizing all the difficulties occasioned by the war, there was no excuse for sending coal containing 33 p.ct. of rubbish all over England. With regard to the Shipping Controller, he was charging a 17s. freight to London. He did not dispute that control was necessary during the war; but the point he was considering was whether it was necessary that it should be continued in the future for all time. The gas industry took a leading part in getting the Price of Coal (Limitation) Act passed. The price of coal was at that time going up by leaps and bounds.

By Mr. Evan Williams: He should think that the increased price of coal had gone to the consumer in an increase of 7d. in the increased price of gas; and this was in the case of a company whose increase had been 1s. 10d. It was very difficult to make a statement on behalf of all gas undertakings.

Mr. Williams: Of the 2s. 6d. increase last year in the price of coal, how much has been passed on to the consumer of gas?

Witness: All of it would be passed on. We have to increase the price of gas to cover the increased price of coal—there is no alternative whatever.

In that way you maintain your dividends?—We have not maintained our dividends.

Continuing, witness said that when the price of gas was (say) 3s. 4d. they were allowed to distribute a 4 p.ct. dividend. If the price varied by 1d., the dividend varied by 2s. 6d. If you put up your price, say, 8d. then your dividend varied by 8 half-crowns. It came down to 3 p.ct., but if the price of gas was brought down, the dividend went up by the same amount. The increase in the price of coal had not been recouped by the higher price obtained from the sale of bye-products. The householder using gas had paid his proportion of the increase; and if a further rise took place, he would have to pay more. When the price of coal went up 1s., instead of the price going up 1d., as it would if the whole of the cost of the coal had to be borne by the consumer, it would go up ½d. On the whole, gas companies were worse off than before the price of coal was raised. As an instance of this, the dividend paid by the Company he represented was £4 17s. 4d. before the war, while to-day it was 3 p.ct. With regard to his statement that in the process of conversion of coal into gas 70 p.ct. of the heat of the coal was conserved for the community, he included in this the whole of the potential energy in the coke and tar, if this was carbonized as it should be. He was not comparing the use of raw coal in a fire. He was taking it for the purpose of steam raising. If one put a ton of coal into a retort, the result was to make up the 70 p.ct.—23 p.ct. of gas could be utilized, 42 p.ct. heat units of the coke, and 5 p.ct. of the tar; making 70 p.ct. But with electricity, if a ton of coal were consumed under a boiler for the purpose of making electricity, there were no bye-products; the coal was totally consumed, and only about 12 or 13 p.ct. would ultimately go to the user of the electricity. The 12 p.ct. was obtained after the whole of the operations were completed after making the electricity.

By Mr. Herbert Smith: He was opposed to the nationalization of mines, and many other people were opposed to municipal undertakings taking over gas companies. A great many gas undertakings were owned by municipal authorities. The National Gas Council's membership was drawn both from gas companies and municipal authorities. Personally, he had had nothing to do with opposing the acquisition of gas companies by municipal authorities, nor had his Association. It was for the town and the local gas company to arrange their own matters, as they very often did. Asked if he objected to their arranging their matters with regard to nationalizing mines, he said it was a big step forward from municipalizing gas undertakings to the nationalization of mines. Before the war gas companies generally asked for tenders for coal; and as a rule the lowest estimate was accepted. In times of peace, it was a question of price and quality combined. The advance that he had spoken of, in some places of 13s. and 10s. 6d. a ton, he did not ascribe solely to the advance in the miners' wages. The Coal Controller had advanced these prices for the various reasons that he gave. Asked if he was opposing the miners' application for an advance in wages, shorter hours, and nationalization, he said that, whatever was done, it should be remembered the coal industry was the basis of other industries.

By Mr. R. W. Cooper: In normal times, they drew the major part of their coal supply from the county of Durham—about 70 p.ct. Speaking for the Gas Light and Coke Company, practically the whole of their supplies were seaborne—150,000 to 200,000 tons came by rail, and the balance of the two million tons purchased came by sea. The coals were bought from the colliery delivered f.o.b. This had been the case for the last few years before the war. They had their own ships, or they provided the ships. A certain part of their supply was obtained through a merchant; and they found the merchant to be a convenient part of their machinery. It suited them better to buy through him. In normal times, they had their ordinary list of contractors, to whom they usually applied. These were people whose worth they had tested by experience. During the abnormal times through which they had passed recently, they had had to suffer the inconvenience of being required to take coal which was not found satisfactory. It was true to say that there were other elements besides coal which entered into the increase in the cost of making gas—wages,

for example. The costs were split-up into two divisions—one being the cost of carbonization, in which they obtained the benefit of the sale of residuals, and, secondly, the cost of distribution. With regard to distribution, there had been a certain rise in the cost of labour and in the materials used, such as pipes and things of that kind. Their standard price was fixed by their Special Act in relation to their standard dividends. If the price of coal was going to be permanently increased, it would completely destroy the basis of the sliding-scale, which was fixed when money had a different value and the cost of coal was different. As a result, the shareholders would suffer very badly. They had 29,700 ordinary shareholders; and taking preference, maximum, and debenture holders, there were about 41,000. He should not be surprised if there were half-a-million holders of gas stock in the United Kingdom. Gas companies used to be very favourite investments for pensioners and ladies of small means, with the result that there were a great many small holders in gas companies. Gas stock was also a very favourite investment with small trusts. It must be remembered that in many gas undertakings there was a co-partnership system, by which the workmen became shareholders. In his own Company, there were nearly 8000 workmen co-partners having stock invested in the Company, for which they received interest. They paid a bonus based on the ordinary dividend of the Company on wages earned. The basis of this dividend was declared from time to time. Of course, it was not possible to move up and down with every movement in wages. If a man earned £200, he got 3 p.ct. on it. His earnings were taken roughly as his capital invested in the business. He had no capital in money—he invested his flesh, his brains, and his bones. The Company bought stock for them, and allocated it in the way he mentioned. At the present moment, he thought the 8000 workmen he referred to held £200,000 worth of stock.

By Mr. FRANK HODGES: The best results were obtained at gas undertakings which had the same coal year after year, because they knew then exactly how to treat it. It certainly would not be a good thing if the different kinds of coal were all lumped together by any system of unification. All works should have, if possible, the choice of their coal, so that they could become accustomed to it. What was wanted was to get the coal with as few handlings as possible from the mine to the gas-works, and, if possible, into the retort-house straight away. The gas industry at the present time was evolving new methods of carbonization; and it would be a great pity to standardize it. If one colliery ceased production—as many collieries had in the past—they would then go to the colliery where the coal was the next best. Their system of carbonization did not depend on merely one coal.

By Mr. ROBERT SMILLIE: There had been a great revolution in gas making during the past forty years. The best cannels had become exhausted. At one time gas companies were bound to supply gas of a certain candle power, and some had this standard still; but recently a standard of calorific value had been introduced. Gas did not depend so much on the illumination given by the gas flame as by the mantle.

Mr. SMILLIE: The gas is so dirty now that if it is sent into the house and burnt with the ordinary burner, people could not see; it must be used with mantles?

Witness: I take exception to the word "dirty." Gas is cleaned just the same as it ever has been. The local authorities see to that. It has to pass the most stringent test with regard to cleanliness.

By Sir ARTHUR DUCKHAM: It was true to say that the gas was cleaned too much, and that the hydrocarbons had been cleaned-out of it.

By Mr. SMILLIE: Gas must be supplied at a certain pressure, or a satisfactory result would not be obtained. There was nothing worse than gas that did not go through the burner at sufficient pressure to produce the proper mixture. It did not cost a company so much to produce gas at the present day as it would if they were bound to give it of a certain candle power without mantles. The public gained by obtaining it at a lower cost than they would do if the gas had to be enriched with cannel coal or oil. He did not know where those people obtained their experience who said that gas-works could afford to supply gas free, seeking for their remuneration in the bye-products. He agreed that the late Sir George Livesey was a great authority; but he never heard him make this statement. Their own experience with regard to residuals had been very curious. They had not tended to give back all that was expected of them. In 1910, they obtained from residuals 81 p.ct. towards the cost of the coal. But, unfortunately, in 1918, though many of the residuals stood at higher prices, they obtained only 61 p.ct. With regard to coke, taking the average of a large number of years, the price was very much the same as the price of coal; and it followed that if a ton of coal produced only half-a-ton of coke, only half was got back in this direction. The carbonization of coal was the most economical way he knew of, in view of the fact that a far larger efficiency per ton was obtained from it. After all was said and done, gas was the most valuable product of coal. From a ton of coal they obtained on an average 12,000 c.ft. of gas, worth now somewhere about 4s. 4d. per 1000 c.ft. If they lost 1000 c.ft. of gas through bad carbonization, they immediately lost 4s. 4d. From this it could be seen that they would be losing their bye-products. His Company put on the market some time ago a material called "Carbo," for which they had to charge a very high price. A few people bought it; but they had to give up the sale, because it was found that, to get back what was lost in not taking the gas from the coal, they had to charge such a high price that it was of no commercial value. Under the present system of carbonization, benzol, tar, and other things wanted by the dye industry were obtained. The gas companies had produced out of a ton of coal more than anybody else could have done. Carbonization of coal was the best way to conserve the national coal stores. Their concern was to keep down the price of coal in order to be able to sell gas cheaply. It was not true at the present time to say the cheaper the gas the higher the dividend. The principle of the sliding-scale was such as to govern the dividend in normal times.

By Mr. R. W. COOPER: Whenever a change was made in the statutory undertaking from the illuminating standard to the calorific standard, it had to be done by the authority of Parliament. Nothing could be done without statutory permission. They were absolutely tied-up by Public and Private Acts. If a change was made from an illuminating power standard to the calorific standard, it had to be done after the matter had been thrashed out in the Committee Rooms, and by Act of Parliament.

OIL PRODUCTION FROM CANNEL COAL.

Final Report to the Council of the Institution of Petroleum Technologists.

It may be remembered that last year a Committee was appointed, under the Chairmanship of Captain R. W. Barnett, M.P., "to obtain evidence in respect of the quantity of cannel coal and allied minerals available in Great Britain as a source of motor spirit, fuel oil, and other products, and to formulate a scheme for the utilization of such supplies." Among those on the General Committee were Prof. J. S. S. Brame and Mr. W. J. A. Butterfield. The Technical Advisers to the Committee were: Geological, Mr. E. H. Cunningham-Craig; Minerals and Supplies, Mr. J. Arthur Greene; Retorting, Dr. F. Mollwo Perkin; Chemical, Dr. A. E. Dunstan and Mr. A. G. V. Berry.

The Committee issued an Interim Report, in the course of which they stated that they regarded with apprehension the situation as to the supply of fuel oil and motor spirit, and the long delay in taking action to develop home supplies. They therefore strongly urged the adoption of a series of recommendations, some of which were as follows:

That the Government should afford all necessary facilities to those who are prepared to find the capital and take the risk for the erection at suitable centres of plant for the treatment on a commercial basis of the material known to exist.

That an experimental station be established forthwith, so that retorts of any design provisionally approved by the Institution of Petroleum Technologists can be erected and tried-out, and material tested with a view to ascertaining its character, oil yield, and residual values.

That such experimental station shall be maintained by and at the expense of the Government; or, alternatively, that the Government shall afford all necessary and reasonable facilities to the Institution of Petroleum Technologists for the erection of a testing-station of their own.

As the outcome of the issue of the interim report, and of the further consideration of the subject by the Committee, the Committee say in their final report that a Company has been formed, known as the Midland Coal Products Company, Ltd. The capital of the Company is £100,000, the whole of which has been subscribed. A memorandum prepared by the Company provides that:

> "The Company has been formed for the production of oil from bituminous material, the manufacture of domestic and industrial fuel, and to deal with chemical and other bye-products obtained therefrom; the establishment of retorting plant on a commercial scale, where various retorts and systems of retorting can be tested out, where material can be treated and its value ascertained, and where such other experimental work can be carried out as may be deemed advisable in order to establish the industry on a national and commercial basis."

A site in the Midlands has been acquired, which is not only situated in the centre of the Midland coalfield, but is flanked by the Great Northern, the Great Central, and the Midland Railways—thus enabling material from all parts of the country to be assembled for treatment. It is important to note also that "while it has been decided to establish the experimental and research station in the Midlands, it is the intention of the Company to test material from any part of the world." The site is adjacent to three shafts at the present moment bringing up a true cannel, an inferior cannel, half-inch top hards, and a soft caking coal—thus providing an excellent and representative series of material for all experimental purposes. In addition to this, the adjacent colliery workings—boilers, electric plant, &c.—afford the means of commercially testing and utilizing residues, whether in the form of smokeless fuel, non-condensable gas, or gas obtained from residues through the medium of a producer.

From all points of view, but more particularly that of investigating the possibilities of establishing the industry on a sound commercial basis, it would have been difficult for the Company to have secured a more desirable site. It is not only the intention of the Company to erect large works (for which purpose an extensive site has already been secured) but also to "assist in the establishment of works and co-operate with colliery owners and others to that end in any part of the world." The Company is receiving no Government assistance, nor is it in any way interested in any particular type of retort or process. In connection with the site secured for the erection of the first large plant, arrangements have been made for the disposal of all the oil, solid residues, gas, and other bye-products obtained.

There can be no doubt that the more economical use of best raw coal, inferior coal, slack, colliery waste, and other bituminous material, not at present brought to bank (or, if brought to bank, put on the pit heaps) is becoming more and more a matter of immediate importance to the country, and more particularly to those engaged in the production and/or the utilization of bye-products, and the generation and distribution of power on a large scale. Upon this point, the Committee recall Clause 7 of the Interim Report, which was as follows:

> "Much of this material has hitherto been mined but not raised, or, if raised, has been thrown upon the spoil heaps or returned to the underground workings. If the substitution of the shovel for the fork, so strongly demanded by the miners, were made obligatory by Government order, still more material would be sent up and wasted. If, however, the recommendations of this Committee

be adopted and retorts erected, the increased supply of material will be utilized and the colliery owner enabled to pay the miner for the extra tonnage brought to bank."

The development of this industry has resulted in the introduction of various designs for new types of retorts, some of which are technically unsound. The establishment of the Company, and the careful consideration, investigation, and testing of all new types of retort where, at the one centre, any character of material and residues can be treated in competitive retorts will form an organization of the greatest national service, and one able, at a minimum cost, to provide an authoritative and decisive statement as regards the most profitable use and method of treatment of any particular material.

In conclusion, the Committee say: An immense amount of work has been done by our Technical Advisers and others who have been actively associated with the work of the Committee; different types of retorts and producers already constructed, and designs and plans of suggested improved methods, have been the subject of careful study; retortable material from all parts of the country has been most carefully investigated; while the present and possible colliery outputs, unworked seams of retortable material, costs, sites, outlets for products (both solid and otherwise) have been gone into; facilities for assembling material at suitable centres have been investigated with great care and detail; and all the data collected for the production of a report showing the possibility of establishing the industry on a sound commercial basis throughout the country.

(Signed) R. W. Barnett, Chairman.

The following resolution was passed by Council of Institution of Petroleum Technologists on the receipt of the final report of the Committee:

At a meeting of the Council of the Institution of Petroleum Technologists, the final report was received from the Committee which had been specially appointed to investigate and report upon the production of oil from cannel coal and allied minerals. It was resolved that the information and data obtained as a result of the investigations carried out by the Committee should be placed at the disposal of the Midland Coal Products Company, Ltd., and others who may, in the opinion of the Council of the Institution, be qualified to make practical use of such information and data, subject to the Company and others undertaking:

(*a*) That the experience gained should be available to all colliery owners in the country desirous of developing the industry.

(*b*) That retorts of any design provisionally approved by the Institution of Petroleum Technologists should be considered with a view to their trial and adoption.

(Signed) Arthur W. Eastlake, Hon. Secretary.

BRIGHTON AND HOVE GENERAL GAS COMPANY.

A Large Decrease in Exceptional Circumstances.

The Half-Yearly Ordinary General Meeting of the Company was held on Friday, at the Offices, No. 5, Great Winchester Street, E.C.—Mr. A. M. Paddon (the Chairman) presiding.

The Secretary (Mr. E. L. Burton, F.S.A.A.) read the notice convening the meeting; and the report and statement of accounts were taken as read.

The Chairman, in moving the adoption of the report and accounts, said that the character of the figures which the Board had to submit to the proprietors was very largely determined by the facts brought out in the following paragraph of the report: "Compared with the results for the half year ended Dec. 31, 1917, the sale of gas shows a reduction of 134,284,100 c.ft., or 15·36 p.ct. This is due to the departure from Brighton of the large number of temporary residents who sought refuge from the air-raids, and to the diminished consumption of gas imposed upon the public by the terms of the Household Fuel and Lighting Order, 1918." In the first place, this told them that there had been a decrease in the business of an altogether exceptional importance. Those who were familiar with gas accounts knew that a decrease in the dimensions of a company's business had an altogether disproportionate effect upon the accounts generally. The smaller divisor, while standing charges remained the same, brought all the other items into a relation with what had gone before so unfavourable as to be almost surprising to those who had not gone through the same experience previously. And if this was true of a normal decrease, they could imagine how great the effect was when they had to record such a decrease as on the present occasion, which was unparalleled in the history of their own undertaking, and very much in excess of what had been recorded during the period under review in connection with other gas undertakings. If this decrease had occurred without any such complete explanation as that which was given in the report, it would have been disquieting; but the circumstances were so extraordinary as to be a matter of general knowledge as affecting Brighton. What happened a year ago was that, in the general disturbance consequent upon the air-raids in London, there was a panic-stricken rush to Brighton, as the nearest point of effectual relief in its proximity; and those qualified to make a statement, said that some 35,000 people within a very few weeks arrived in Brighton, as the result of the exodus from London, and took up their residence there, with all the disturbing effect consequent upon such a movement. This number would mean somewhere about 20 p.ct. of the population of Brighton. But looked at as regarded gas consumers, it was a vastly greater disturbance than was indicated by this percentage, because these 35,000 people were all potential consumers—quite different from the ordinary individual as included in a census of the population. They came; and means had to be improvised to give them light, heat, and cooking. Gas was the only means by which such an extempore supply could be devised. This did the Company a great deal of harm at the time. It dislocated their processes of manufacture; it synchronized with a period of extreme difficulty in getting materials; it taxed the works at the very moment when relief was wanted, because they had for some time previously been unable to effect the necessary repairs; and in its incidence it was a very great disadvantage to them. But while it left the standing charges as they were, it added to their receipts, and induced an exotic prosperity which was not real, and was as little permanent as real. The departure of these thousands of people was as great a disadvantage as their arrival, because there was with the decrease of business, standing charges remained as before, and all means they had extemporized to meet this extraordinary increase were left on their hands. So whether in coming or whether in going, these people had been a great disadvantage to the Company in the conduct of their operations. Then as regarded the past six months they had had to consider the effect of the restriction upon the use of gas and coke as fuel. The effect of this on their accounts was bound to be important. It was these two matters together which constituted the cause of all that was unfavourable in the accounts.

THE ACCOUNTS.

The report also recorded an increase in the price of gas which they were compelled to make in order to meet the common difficulty of all gas undertakings—the increased cost of coal, oil, and wages. But though the increase of 6d. was made, it only brought their price up to 4s. 2d. per 1000 c.ft., which was 2d. less than the amount charged by the great Metropolitan undertakings during the whole of the six months to which these accounts related. This was also qualified by the fact that the Brighton Company did not enjoy the increase over the whole of the half year. It was only in the final three months that they were able to get the benefit of this moderate additional demand upon the consumers. The capital actually expended represented only £393 per million c.ft. of gas sold; and this had proved the sheet-anchor through all their adverse circumstances. With the capital at this low figure, and with anything like an efficient equipment at the works, much could be done in the worst times. The total rental was less, in spite of the increase in the price of gas, by £6791; but the residuals had given them £3274 more, which was a surprising figure, having regard to the fact that they had necessarily used less raw material in obtaining their results. But they had brought a certain amount of residuals that had accrued in the past into this half year. The fact was that in the whole history of the Company up to the last few years they had never used anything but sea-borne or Durham coal, which possessed its own peculiarities in manufacture. Some three years ago, however, in their exigency, they had had to turn for relief to supplies of Midland coal; and the result was that, inasmuch as their plant had previously only been occupied in the treatment of Durham coal, and much of their apparatus adapted to it, there was a production of small coke and breeze which, under the conditions of pressure, they could not exactly place in its proper category in the accounts. It was aggregated in the works; and until they could deal with it more particularly, it was not easy to classify. Since then, they had been able to clear some of the accumulations, and reduce this asset to its proper terms. Possibly in future accounts they might be able to classify even more in this regard. On the other side of the account, they had, under existing conditions, temporarily suspended some of their processes of depreciation. In regard to many undertakings, this would be a procedure as dangerous as extraordinary; but looking back over the past, and realizing the prominence which the Company had always given to the depreciation of their assets, they felt they were justified in lightening the burden to the extent of producing such a statement as was laid before the proprietors. In connection with the maintenance of works and plant, they had expended 4½d. per 1000 c.ft., which, in pre-war times, would have been an ample figure. Repairs and maintenance of mains cost over 2½d., which was a high figure; and the amount for meters was getting on towards ¾d., which was sufficient. It was in the repair and maintenance of stoves and fittings that they had temporarily lightened the demand on their accounts. The receipts were £3752 less than in the corresponding period of the previous year. They had reduced the expenditure by £1189; and the profit had fallen by £2562. There was carried forward an amount of £18,563 to profit and loss account. Some of those to whom he was speaking knew that the maximum burden of the last five years had fallen upon those who were dependent upon sea-borne coal, and there had been a comparatively easy measure of duty allotted to those dealing with rail-borne coal. This state of things was going to change. With the passing of the war, certain relief would come to those using sea-borne coal; and they would probably see in the course of the next six months that the cost of sea-borne coal would go down, and that of rail-borne coal would go up, until they met midway between the points that had separated them. As to the profit and loss account, they required altogether £20,423. They had earned or acquired by interest £18,573; and the deficit on this occasion was £1850, which amounted to very little more than ¼d. per 1000 c.ft. He thought, in all the circumstances, this was a fairly satisfactory result.

AS TO THE FUTURE.

It was, however, no doubt in regard to the future that the proprietors, like the Directors, felt the greatest degree of apprehension. They were not only concerned with their domestic affairs and difficulties, but there was that overshadowing dread of what might develop in connection with the coal supply as affecting their Company and all forms of industry throughout the country. It was disquieting, and, coming after so much that they had borne and surmounted, it was depressing. If they examined what was transpiring in regard to the demands of labour, and what was happening at the present moment, they could he thought see where finality would supervene; but they could not tell what would happen between now and the time when this finality would be reached. He then went on to review the labour position at some length.

Mr. G. W. Carey (the Deputy-Chairman) seconded the motion for the adoption of the report and accounts; and it was agreed to.

Proposed by the Chairman, and seconded by Lieut.-Colonel C. L. Morgan, dividends were declared at the rates per annum (less income-

tax) of 6 p.c. on the "B" preference stock, 4 p.c. on the "C" preference stock, 7½ p.c. on the original ordinary stock, and 5¼ p.c. on the "A" ordinary stock.

On the motion of the CHAIRMAN, seconded by Mr. CAREY, the retiring Directors (Mr. F. H. Jones and Mr. J. M. Miles) were re-elected; the Chairman paying high tribute to the services rendered by Mr. Jones to the Company and to the gas industry generally.

Mr. Lewis Hardy was also re-elected an Auditor; while Mr. William Cash was appointed Special Auditor to act in conjunction with the Special Auditor to be appointed by the Corporation.

Mr. CASH, in acknowledgment, referred to the question of depreciation, and said he did think the Directors of the Company had every justification, under the peculiar circumstances in which they found themselves placed, for adopting the course they did, particularly in view of the fact that they had for many years dealt very adequately with this matter.

Mr. H. E. JONES, proposing a hearty vote of thanks to the Directors, remarked that the office of director was by no means a bed of roses. The coal position might be judged by the callous admission they had had that coal had been raised 2s. 6d. a ton, and the Treasury share was swelled by the larger part of £40,000,000, although there had been no deficit but a fair profit the previous year. They were callous to the fact that gas investors were losing their dividends, and that a small share of this £40,000,000 would have gone far to maintain the modest return they had hitherto enjoyed. Many of them had bought their shares to return 4½ p.c. or less at the time of purchase. As to the labour question, the moral of it all was that, while they had taught the working man much that was useless, they had forgotten to make him acquainted with the plain elements of political economy.

The resolution was seconded by Mr. HOUNSOM, cordially passed, and acknowledged by the CHAIRMAN.

The officers and staff were thanked for their services during the past half year, on the proposition of Lieut.-Colonel MORGAN, seconded by Mr. F. H. JONES; and Mr. BURTON and Mr. C. H. RUTTER (the Engineer and General Manager) responded.

SHEFFIELD GAS COMPANY'S MEETING.

The Annual Meeting of the Company was held on Monday of last week, in the Cutlers' Hall, Sheffield—Colonel H. K. STEPHENSON, M.P., presiding.

The CHAIRMAN, in moving the adoption of the report [*ante*, p. 406], said that, like other similar undertakings, the Company had been adversely affected by the war. He wished to emphasize the part which the Company had played in the war. Not only did they, in circumstances of very great difficulty, supply the increased quantities of gas required by the great local munition works, as well as quantities of toluol and benzol to the Government, but no fewer than 551 of the officials and workmen joined the forces. Of this number, they were glad to welcome back 186. Unfortunately, 48 had been killed.

MACHINERY AND LABOUR DIFFICULTIES.

There had been a decrease of 10·23 p.c. in the quantity of gas sold during the twelve months. This was mainly due to the restrictions placed on the consumption of gas by the Household Fuel and Lighting Order. The actual decrease in the quantity sold during the six months to Dec. 31 was 14·58 p.c.; and this included a falling off during November and December in the quantity of gas used in the manufacture of munitions. Another reason for the reduction in the quantity sold during the year was that, owing to the difficulty in obtaining labour and machinery, the Company had not been able to supply gas at the pressure they had been in the habit of doing. To give only two instances of the difficulty in obtaining plant, he mentioned that a De Brouwer machine for charging retorts, which was ordered on May 11, 1917, had only been delivered during the past few weeks; and a telpher installation for the removal of coke from the retort-house, which would have caused considerable economy in labour, ordered on the same date, had only just been started. Thus these machines did not arrive in time to help them to supply the gas which was required during the war period, but only now, when the quantities of gas needed had decreased. The same trouble had been experienced in obtaining parts of existing machinery, for want of which considerable delays had occurred through breakdowns, which had not only affected the quantity of gas sent out but also to some extent the quality. With regard to labour, he thought they in Sheffield had suffered more than any other city in the kingdom, because so many men had been required in the large munition works, where the labour was undoubtedly more congenial than was the case with gas-works. The wages were high, and the work was clean; and he did not think it was as hard as that in gas-works. In order to overcome this difficulty, they had been obliged to employ women in the retort-houses. The South Metropolitan Gas Company were the first to employ women in this class of work; and 36 women were sent to London by the Sheffield Company, and spent several weeks there learning the work, under the direction of Mr. Chichester, of the Ministry of Munitions, who had taken great interest in the matter, and had been of considerable help to the Company. These women, in their turn, instructed others; and he was pleased to be able to add that the women had performed their work in a most creditable manner. In fact, the only fault that one had to find with them was that they were really too keen, and suffered from nerves if their results were not as satisfactory as they thought they should be. They were very sensitive, and very proud of their work. In addition, the Company had had a considerable number of women engaged on various duties—such as washing and loading coke, turning over purifying material, and even acting as bricklayers' labourers, &c. During the past winter the average number of women employed had been 263.

INCREASED COST OF COAL.

Over the past six months the average price of coal had been 25s. 7·93d. per ton, as compared with 9s. 10d. per ton in the second half of 1914. The actual increase authorized by the Government had been 10s. 6d. per ton; and the difference was due to the fact that the Coal Controller, in order to overcome transport difficulties, divided the country into districts of supply, and in the place of gas coal had allotted to the Company house and even steam coal (both of which were unsuitable for gas-making), at considerably advanced prices. The Company, therefore, suffered in two ways—in having to pay more, and in having an article from which good results could not be obtained. This coal had also a serious effect on the working, as, owing to its quality, the coke could not be discharged from the retorts by their hydraulic machines, and on account of its hardness, the breakers, which were installed for dealing with soft coal, were frequently put out of order, thereby increasing the labour required to deal with it—labour which, as he had mentioned, had been difficult to obtain. Another matter of which the Company had to complain was the great falling off in the quality of the coal supplied, the ash in some cases running as high as 30 p.ct. The total wages paid by the Company in 1914 were £117,757, while last year the amount was £278,307. When, in addition to these largely increased costs of labour and coal, they took into consideration that, among other things, fire-clay goods had doubled in price, that iron had risen from £7 5s. to £20 per ton, and that both of these materials were largely used in gas-works, it was not surprising that the price of gas had had to be advanced.

DIVIDEND RESTRICTIONS.

The unfortunate part of it was that, whereas the dealers in these commodities had been benefiting, the profits of their own Company had fallen off; and the dividend on the class "C" stock, owing to the Company being compelled to advance the price of gas to meet these increased costs, was actually reduced. The intention of Parliament in fixing the price of 2s. 9d. per 1000 c.ft. at which the full dividend could be paid, and providing for a reduction when the price exceeded this figure, was to encourage economical management. It did not, however, appear fair or reasonable that the shareholders should be penalized by law on account of a condition of affairs quite outside the control of the Directors, but attributable to the war, and largely due to the action of the Government. The increases in coal prices and in wages—the two things which, more than any others, had necessitated the increases in the price of gas—had been decreed by Government Departments. But in increasing the prices of coal (surely as much a commodity of public necessity as gas), the Government did not stipulate that the coal companies should reduce their dividends; nor, in his opinion, would it have been right that they should have done so. But equally was it unfair, when the price of gas was forced up by Government action, that gas companies should not be released from their obligation to reduce dividends when the price of gas rose beyond a certain figure. The range of prices included in the limits of the sliding-scale of the various Acts under which the different gas undertakings worked—however suitable they might have been to the conditions prevailing before the war—were quite unsuited to those of to-day, when all prices had risen so enormously. The Directors were hopeful that some steps would be taken by Parliament to permit gas undertakings to pay their pre-war dividends. No one could complain that the Company had not been economically managed in the past. For many years the advantages of such management had been entirely in favour of the consumers, and the Company attained the enviable position of supplying gas at very nearly the lowest price in the kingdom. At the same time the wages paid to the workpeople were as high as those of any other gas undertaking. The profit required to pay the full dividend was extremely small—about 4d. per 1000 c.ft. of gas sold. In fixing the prices of various commodities, the Food Controller had always provided that a reasonable profit should be allowed to both wholesale merchants and retailers; and it could not be conceivably contended that gas undertakings should not receive similar treatment.

GREATLY INCREASED EXPENDITURE.

He mentioned a few items showing how enormously costs had gone up since the beginning of the war. Last year they paid for coal £496,431, as against £219,860 in 1914; stokers' wages, £111,539, as against £38,216 in 1914; and for repairs and maintenance of works, £134,325, as against £60,721 in 1914. The Company had completed the purchase of the land at Wadsley Bridge, and had parliamentary authority for building gas-works there. They did not, however, propose to start erecting them immediately, on account of the high cost of materials. In the meantime, they had installed plant at Neepsend for the production of water gas; and they were also obtaining a supply of coke-oven gas which would carry them on for a time, when they hoped the outlook would have improved. Since the report was issued a further general advance of 5s. per week had been awarded to the whole of the Company's workmen; and this would cost the Company £19,500 per annum. Then there were the questions of a reduction in hours and the advance of miners' wages. It would therefore be necessary for the Directors to take into consideration the question of a further increase in the price of gas to cover the increased cost of production.

MR. HANBURY THOMAS'S RETIREMENT.

Referring to the approaching retirement of Mr. Hanbury Thomas, the Chairman said that for more than 36 years Mr. Thomas had devoted himself to the service of the Company; and, until the war interrupted normal development, the whole record of that period was one of continuous success. In 1883, he believed, when Mr. Thomas entered the service of the Company, the profit required to pay the dividend amounted to 1s. 0½d. per 1000 c.ft.; whereas the profit needed to-day for a similar purpose was only 4d. Mr. Thomas was as good a servant to the community as he was to the Company. He devoted his energies to ensuring that Sheffield should have a plentiful supply of gas which should be at once the best and the cheapest in the country, and—with the exception of Widnes—this Company did, under Mr. Thomas's management, supply this, until the conditions of war in a munitions area like Sheffield made it no longer possible. Those of them who had had the pleasure of working with Mr. Thomas—as some of them had had for many years—knew that they would never have a more loyal friend and colleague, or the Company a more devoted servant. He was sure they would all join with him in wishing Mr. Thomas many years of happiness—a happiness which would be much enhanced if he saw the Sheffield Gas Company once more on the high

road to prosperity. In conjunction with Mr. Thomas's impending retirement, he had to announce that Mr. Ralph Halkett, at present Assistant Manager to the Glasgow Corporation Gas Department, had been appointed General Manager of the Company.

Mr. B. G. Wood, seconding the adoption of the report, said the public did not realize how much they were indebted to Mr. Thomas for what he had done for Sheffield during the last 36 years. The war was responsible for the balance-sheet not being more favourable; but he would be disappointed if their position was not greatly improved by the end of this year. They had a capable Engineer in Mr. W. H. Johns.

The report was adopted, and dividends for the half year were declared of 2½ p.ct. on class "A" and "B" shares, and 2⅝ p.ct. on class "C" stock.

Thereafter, at an extraordinary meeting, the proprietors agreed to a proposal by the Directors that they should raise the sum of £485,000 authorized by the Sheffield Gas Act, 1917, either by borrowing on mortgage or by the issue of debenture stock, on such conditions and at such times as they might deem to be necessary for the providing of additional capital.

Mr. Hanbury Thomas, returning thanks for the references to himself, said he had been very proud of the position the Company held. Undoubtedly, they had achieved a very great measure of success; and they were certainly in the very forefront of gas supply. He did not think that gas would be permanently dear, though he doubted whether it would ever come down to as low as it was before, because the conditions were different, and likely to remain different. At the same time, he felt that the Company would regain the position they had held for so long a time. He had done his duty honestly, and had always taken great pleasure in his work; but unless he had had the support and advice of a very able Board of Directors and the co-operation of an efficient and loyal staff of officials, the success of the Company could not have been achieved. Undeniably, it had been a very great advantage to Sheffield to have a cheap supply of gas; and all classes had benefited thereby.

NORTH MIDDLESEX GAS COMPANY.

Gas at a Moderate Figure.

The Half-Yearly Meeting of the Company was held on Monday of last week, at the Offices, No. 5, Great Winchester Street, E.C.—Mr. A. M. Paddon (the Chairman) presiding.

The Secretary (Mr. E. L. Burton, F.S.A.A.) read the notice convening the meeting; and the Directors' report and the statement of accounts were taken as read.

The Chairman said he ventured to think the proprietors would find the report and accounts, upon closer examination, even more favourable than they would at first sight appear to be. Undoubtedly, there were in them one or two matters of an adverse nature. The first was that there had been a decrease in the business, which was an altogether unwonted experience with them. But this had proved transient in its character; for during the current half year they had not only made up all arrears, but had a substantial increase in business standing to their credit at the present date. The report made reference to the large reduction of profit and of the balance carried forward to the credit of the profit and loss account; but with regard to the actual profit for the period under review, this was within a very few pounds of that of the previous year. The amount carried forward was subject to qualification. It would not have been at all difficult, while presenting an excellent statement, to have avoided any reduction of profit carried forward. The capital per million cubic feet of gas stood at £625, which, while larger than he would desire to see it, was not inconsistent with the fact that the Company's works were of an entirely modern description with respect to plant, and that the assets as represented by freehold land were very much in excess of what was ordinarily held by a company of their size and position. Coming to the revenue account, it should be remembered that in the past half year they had not enjoyed the whole time the increase in the price of gas to the maximum figure indicated—3s. 11d. per 1000 c.ft.; for in the first three months they were only charging 3s. 9d. When they reflected that 3s. 11d., which was the maximum charge the Company had so far made, was 5d. below the charge of the more important Metropolitan undertakings during the same period, it would be seen that they had not made any great exaction on the consumer to meet their financial difficulties. The return from residuals stood at £8328; and the significance of this figure was that it represented over 1s. per 1000 c.ft. The revenue account had been heavily charged for repairs and maintenance. For repair, maintenance, and renewal of works and plant, the charge was 7·65d. per 1000 c.ft. of gas. Now, 1d. per 1000 c.ft. represented a little over £700 in this account; and as the deficiency amounted to just over £1000, if they had charged 6d. per 1000 c.ft. under this head, they would have still been charging a high figure, and the deficit would have wholly disappeared. Repairs and maintenance of mains and pipes were just under 1d.; of meters, nearly 2d. (a very ample figure); and of stoves and fittings, nearly 4½d. per 1000 c.ft. So that the total charges for repair and maintenance were practically 15d. per 1000 c.ft.—a satisfactory feature whichever way it was looked at. The cost of materials and labour had gone up so much that unless they charged amply, they would charge inadequately; and though the figures he had quoted might appear heavy in comparison with pre-war rates, nevertheless they were not more than was adequate to maintain the position of the Company in this regard. The total receipts were £1947 greater than a year ago, the expenditure was £1070 more, and the profit was thus £23 less. They required for dividend £5374, and a further £687 for interest on debenture stock. These two items could be practically met out of the profits; but there was a heavy charge of £1161 for income-tax. So that there was a total charge on the funds of £7233; and the result of the trading was a sum of £6208—making a deficiency of £1025. The current half year promised well, with an increase in business; and as to the future, while they could sell gas at under 4s. per 1000 c.ft., they had very little to fear from any form of competition. All industries based themselves upon the coal supply; but it was the gas industry alone of which it could be said that they wasted nothing. Of a ton of coal given to a gas engineer, he could render an account almost down to the last decimal point. No doubt one day the use of bituminous coal in household fires would be prohibited. It was in the gradual recognition of the overwhelming economy of the gas process as compared with any other fuel that the chief hope of their industry lay. He moved the adoption of the report and accounts.

The resolution was seconded by Mr. H. A. Lermitte, and unanimously passed without discussion; and thereafter dividends were declared for the half year, less income-tax, on the preference capital at the rate of 5 p.ct. per annum, on the original ordinary capital 11 p.ct. per annum, and on the additional ordinary capital £7 14s. p.ct. per annum. The retiring Director (Mr. A. M. Paddon) and the Auditor (Mr. L. Hardy) were re-elected.

Hearty votes of thanks were passed to the officers and staff, and the Chairman and Directors. The Chairman, in proposing the former vote, said the results of the Engineer and Manager (Mr. Lawrie Trewby) were very good; and he knew that Mr. Trewby had hopes of making them even better in the coming half year.

SITE FOR NEW GAS-WORKS AT BURNLEY.

Colonel Ekin, M.Inst.C.E., on behalf of the Local Government Board, held an inquiry on Wednesday last into the application by the Burnley Corporation for sanction to borrow money for the purchase of 27 acres of land at Old Hall for their gas undertaking, including the construction of works of manufacture, distribution, and storage of gas.

Mr. Ritchie, the Deputy Town Clerk, explained that but for the war the Corporation would have proceeded in 1015 for statutory powers, as they had entered into a provisional agreement to buy the land. Since that time, the existing incapacity of the present gas-works had become more pronounced, making the necessity for extension a matter of great urgency. The present works at Lane Bridge covered an area of 7 acres, and 2·3 acres at Stoneyholme were used for storage and distribution only. The works had a manufacturing capacity per day of 3,000,000 c.ft. of coal gas and 1,500,000 c.ft. of carburetted water gas. This was, of course, when everthing was in working order. The maximum daily consumption was 3,909,000 c.ft. In order to ensure a supply of gas to the town, a margin of 20 p.ct. ought to be allowed between the maximum supply and the maximum daily consumption. The total storage capacity was 2,600,000 c.ft., or only 66 p.ct. of the daily consumption. It was impossible to make the required extensions at the existing works, which were in the centre of the town and in a congested area. There was no space on the present works on which to erect a new gasholder. On the new site, there were marked conveniences, such as a railway and sidings and canal. The total cost of the land would be £13,261.

Mr. J. P. Leather, the Gas Engineer, stated that the quantity of gas consumed in the district in one day had been as much as 3,909,000 c.ft.; and this demand necessitated the mixture of 33 p.ct. of carburetted water gas. It would, therefore, be seen that an increase in the manufacturing plant could not be long delayed. As the storage capacity at Stoneyholme, where the whole of the gas manufactured was conveyed, was only equal to 66 p.ct. of the daily supply, it was imperative to have a new gasholder at the earliest moment. It was proposed to erect as soon as possible a holder of at least 3,000,000 c.ft. capacity, increasing the total storage to 5,600,000 c.ft., which was only a very reasonable figure, seeing that they were being called upon to send out 4,000,000 c.ft. of gas per day. They first proposed to put up a gasholder. But it was deemed advisable to look ahead; and this site would satisfy them for twenty years. It was very difficult indeed to estimate with any accuracy the cost of a gasholder at the present time, but he had estimated as nearly as possible a round figure of £100,000. There was much opposition from property owners; the allegation being that the fumes from the new works and the proximity of the latter would depreciate the property and cause the millowners in the district to lose their best workpeople through removals. Mr. Leather told the critics of the scheme that he could guarantee to have a garden, flowers, and trees within 300 yards of the works. They had men at the works who had been there for fifty years, and men had lived up to eighty years of age. There would be no obnoxious smells from the new works as from the old works.

Alderman H. Emmott said he had been Chairman of the Gas Committee for 22 years, and through all this period they had been considering the desirability of new works. He was of opinion that extension at the present time was a very urgent matter. They had had difficulty during the last year or two in keeping the town going—in fact, they had not kept it going on all occasions. Once the mills had to stop before 5.30, because they could not make gas fast enough. He considered the site proposed very suitable, and it was really the only available one in the whole of the town. He did not think the erection of the gas-works would be detrimental to property.

Theft of Coke.—At the Greenwich Police Court last Tuesday, Edward Harbard, a labourer, pleaded guilty to stealing 2 cwt. of coke, the property of the South Metropolitan Gas Company. Mr. Washington, prosecuting for the Company, said the defendant was in the employ of a contractor who delivered coke for the Company; and the detection of his offence was due to a coal officer of the London County Council. This witness, George Talbot, said he saw the defendant, after delivering three sacks of coke at Ashburnham Road, Greenwich, deliver two at a house in Christchurch Street. When asked for his delivery ticket, he said: "I have none for these two sacks; it is my mother's house." Mr. Scard, pleading for leniency, said the defendant was new to this particular job, and finding he was left with two sacks, he yielded to the temptation to take them home. He bore an excellent character. Mr. Disney imposed a fine of £5.

CALORIFIC VALUE OF NEW ZEALAND GAS.

PROPOSED MINIMUM OF 500 B.TH.U. NET.

[From the "Board of Trade Journal."]

The supply, price, and calorific value of manufactured coal gas in New Zealand are dealt with in the second annual report of the Board of Trade, in which the causes of the low calorific value of Wellington gas are summarized as follows: (1) Damage done to retort-settings during strike; (2) inferior coal; (3) labour difficulties; (4) naphthalene forming a stoppage in service-pipe reduces gas-pressure, and consumer naturally concludes that gas is at fault. To remedy this, measures have been adopted.

Independently of the evidence submitted in this connection, the Board of Trade examined the Dominion Analyst on the matter. Tests were taken on coal gas manufactured in Wellington, Auckland, Christchurch, and Dunedin between Nov. 16 and 26, 1917; and the results showed that the calorific value of Wellington coal gas was the lowest of all, while the percentage of incombustible gas was much greater than in either Auckland or Christchurch gases. The calorific values were calculated from the analysis, and represent gross values. The net calorific value would be approximately 10 p.ct. less in each case. The following table shows the result:

	B.Th.U. (Gross).
Wellington (best of three tests)	486·80
Auckland	508·00
Christchurch	506·01
Dunedin	495·89

PROPOSED LEGISLATION.

The Board recommend that legislation be introduced making it compulsory that the quality of gas supplied by a gas company shall, with respect to its heating power, be not less than 500 B.Th.U. net. Legislation on the lines of this recommendation was enacted in Great Britain in August, 1916, by the Gas (Standard Calorific Power) Act, 1916, and in New South Wales by the Gas Act of 1912. Regulations issued under the latter Act on Sept. 17, 1913, prescribed that "the British thermal unit shall, for the purpose of this Act, be the British thermal unit net, in which the latent heat of the vaporization of the water-vapour in the gas consumed shall be deducted from the gross result. The result shall be corrected for atmospheric pressure and for temperature, and in such other particulars as the gas examiner may deem necessary in order to arrive at the true measurement of the heat produced."

ANALYSES OF NEW ZEALAND GASES.

The following analyses of coal gases manufactured at various centres are given in the report.

Nos. 1, 2, 3, Wellington coal gas; No. 4, Auckland coal gas; No. 5, Christchurch coal gas; No. 6, Dunedin coal gas.

ANALYSES.

	(1)	(2)	(3)	(4)	(5)	(6)
Carbon dioxide	3·77	3·38	3·08	4·24	3·80	3·09
Unsaturated hydrocarbons	3·51	3·38	3·57	3·50	3·30	3·33
Oxygen	1·76	1 25	1·47	1·37	0·90	1·85
Carbon monoxide	9·41	9·37	8·50	10·84	13·80	7·77
Methane	22·26	23·51	24·27	25·00	24·50	27·27
Hydrogen	38·46	39·11	40·14	42·57	42·00	36·07
Nitrogen	20·83	20·00	18·97	12·48	11·70	20·62
	100·00	100·00	100·00	100·00	100·00	100·00
Percentage of incombustible gas	26·36	24·63	23·52	18·09	16·40	25·56
Calories per c.ft. (gross) measured at 60° Fahr. and 30 in. pressure	116·52	119·43	122·62	127·96	127·46	124·91
British thermal units per c.ft. (gross)	462·60	474·14	486·80	508·00	506·01	495·89

CURRENT SALES OF GAS PRODUCTS.

Tar Products in the Provinces.

March 17.

The average values for gas-works products during the week were: Gas-works coal tar, 36s. to 41s. Pitch, East Coast, 47s. 6d. to 50s. per ton f.a.s.; West Coast—Manchester 45s. to 50s., Liverpool 45s. to 50s., Clyde 45s. to 50s. nominal. Benzol 90 p.ct., North, 1s. 10d. to 1s. 11d.; 50-90 p.ct., naked, North, 1s. 9d. to 1s. 10d. Toluol, naked, North, 2s. 3d. Coal tar crude naphtha in bulk, North, 8¼d. to 8½d. Solvent naphtha, naked, North 2s 5d. to 2s. 6d. Heavy naphtha, North, 2s. 10d. to 2s. 11d. Creosote, in bulk, North, 5d. to 5½d. Heavy oils, in bulk, North, 6d. to 6½d. Carbolic acid, 60 p.ct., unsaleable. Naphthalene, £25 to £30; salt, £6 to £7, bags included. Anthracene, "A" quality, 4d. to 6d. per minimum 40 p.ct.; "B" quality, 1½d. to 2d.

Manchester District Tar Prices.

The average price realised for tar in the Manchester district, based on the value of the products, for the month of January was £2 3s. 3d. per ton.

FROM A MARKET CORRESPONDENT.

Tar Products.

There is no decided change in conditions of the tar product markets. Exports of pitch continue to expand, and the London quotation remains firm. In the Provinces, there is a good demand, both for home and export accounts, although transport and shipping difficulties are still great, and prevent any big extension of the export trade. The result is that, although prices are gradually advancing, the rise is not as rapid as might otherwise be the case. Prospects, however, are considered satisfactory, as there is likely to be a good demand for pitch for road making very shortly. Local authorities are already moving in the matter. Benzols are in good demand for motor purposes, and the price keeps firm at late rates. There is no prospect of a fall in prices yet awhile—at any rate, while the price of petrol remains round about its present level. At the same time, it has to be borne in mind that conditions regarding the American supply of petrol might change very rapidly. Toluol is lower. Creosote remains firm with a good demand. Solvent naphtha exhibits irregularity at a lower level, and in some quarters a further decline is looked for. Heavy and crude naphthas are about the same. Refined naphthalene is cheaper; and here, again, lower prices are expected. Crude is dull, and inclined to give way. Prepared tars are in good request, and cresylic acid is just steady; but the bottom seems to have fallen out in the market for carbolic acid. Crystals are again lower, and there is nothing to be done in crudes. It would seem that production will have to be dropped altogether, or curtailed for a time, at any rate. Other products are without special feature.

Advices from America indicate that production of some products is far in excess of demand, and output has been reduced in some cases, or has ceased entirely. Phenols are not much wanted. A small market is being found for benzol as a motor fuel—this market is expanding, however. Solvent naphtha and toluol are also being used for fuel purposes.

French markets are without any particular feature.

The range of home quotations is as follows:

Benzol: 90% London, 2s. 1d. to 2s. 3d. per gallon; 50-90%, 1s. 11d. to 2s. 2d. per gallon.

Carbolic acid: Crude 60's unsaleable; crystals 40%, 5d. per lb.

Crude Tar: London 40s. to 41s.; Midlands 34s. to 36s.; North 35s. per ton *ex* works.

Pitch: London, 65s. to 70s. per ton; East Coast, 48s. to 50s. per ton; West Coast, 44s. to 45s., with Manchester 42s. per ton and Glasgow 47s. 6d. per ton; South Wales, 53s. per ton.

Solvent Naphtha: London 2s. 8d. to 3s. Provinces average 2s. 6d. per gallon.

Crude Naphtha: Naked 10d. per gallon.

Heavy Naphtha: 2s. 8d. per gallon.

Naphthalene: Refined £22 10s. per ton nominal; crude £7 to £13 10s. according to quality.

Toluol: Naked, 2s. 1d. to 2s. 3d. per gallon nominal.

Creosote: London 7d., North 5½d., heavy oil, 7½d. per gallon in bulk.

Anthracene: 40-45%, 4½d. to 8d. per unit per cwt.

Grease Oils: 18° Tw. (naked) £6 per ton f.o.r. makers' works.

Aniline Oil: 1s. 2d. per lb.

Cresylic Acid: 95%, 2s. 9d. to 3s.; 97-99%, 3s. to 3s. 3d. *ex* works London; f.o.b. other ports.

Sulphate of Ammonia.

Production is quite up to recent level, and there is no difficulty in disposing of outputs to home consumers. While sulphate of ammonia is regarded as cheap, this rate of consumption is likely to continue; so that, in default of any unforeseen large development of domestic production, it is difficult to see that much can be released for export. The control of ammonia manufactures is now withdrawn, and export restrictions on sulphate are being interpreted rather more generously, especially as regards the Colonies and near allies. Manufacturers, consequently, are not particularly anxious to part with their outputs, as better prices are obtained for foreign orders.

A report from France gives the official price of sulphate of ammania there as 96 francs for 100 kilos. Exports from this country to France during February were 1876 tons, averaging £18 13s. per ton; so that there should be room for considerable improvement in export values. This position is worth watching.

From the United States comes the information that stocks on the Pacific Coast—an important sulphate of ammonia centre—are plentiful, and supplies are arriving steadily from the east. Most of the product now moving to the Pacific Coast is probably in fulfilment of contracts; but apart from the quantities necessary to take care of these old contracts, there is a fair amount available for the general market. The price is, consequently, lower at the equivalent of about £23 per ton in bulk. Small lots still command up to about £27 per ton. The Pacific Coast farmer is being educated in the use of this fertilizer by some local propaganda, which has been interesting itself of late in a new brand of sulphate specially adapted for direct application to the land. This product, it is stated, is specially dried, finely ground, and contains 25¼ p.ct. of ammonia

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At the Leeds City Council lately, it was complained that Yorkshire coal, which was close to their doors, was diverted to the Midlands and London, and the Corporation had to get coal from Durham, which cost 7s. 2d. per ton more, and was of inferior quality. This meant for the Gas Committee at least £39,000 a year. Now that many of the war needs were over, it was strongly felt that the Yorkshire coal ought to be available.

Ratepayers at Harringay have held a public meeting to protest against what they declare to be the bad lighting of the district. The following resolution was unanimously passed: "In view of the danger to life and limb caused by the bad lighting of the streets in Tottenham, this meeting of Harringay ratepayers requests the District Council to immediately deal with the question, so that this danger may be removed; and this meeting also calls upon the Gas Company to improve the quality and quantity of gas for all purposes."

The balance-sheet of Messrs. C. & W. Walker, Ltd., as at Jan. 31 last, shows a profit for the year, after charging Directors' fees and depreciation on buildings and plant, amounting to £19,895. After adding the balance brought forward, there is a sum of £31,567 standing to the credit of profit and loss account; and out of this the Directors recommend a dividend at the rate of 10 p.ct. per annum on the ordinary shares, and a bonus of 1s. per share, both free of income-tax. After placing £5000 to reserve, there will be carried forward £11,872. The meeting will be on April 3.

THE NECHELLS GAS-WORKS ACCIDENT.

Resumed Inquest Proceedings.

Last Thursday, there was a resumption by the Birmingham City Coroner (Mr. T. Bradley) of the inquest on the bodies of the men who lost their lives in the accident at the Nechells Gas-Works of the Corporation [as recorded on p. 473 of the "Journal" for the 4th inst.], when two workmen and two firemen were gassed. The accident occurred on Feb. 26 in the governor-house. Repairs were being carried out to one of the governors, and, owing to a sudden leakage, a man named Davey was gassed immediately. Later, during rescue operations, the three other men lost their lives. The victims were R. H. Davey (34), gas-fitter, H. J. Ward (18), fitter's labourer, Fireman H. W. Dyche (27), and Station-Officer H. A. Moon (40).

Mr. J. E. Harston and Mr. H. R. Rogers, H.M. Inspectors of Factories, were present; and the legal representatives in attendance included Mr. F. C. Minshull (Town Clerk's office), Dr. Sadler (instructed by Messrs. Mayhew and Darling, for the Amalgamated Society of Operative Heating and Domestic Engineers), for Mrs. Davey, and Mr. T. Foster Duggan, for the Amalgamated Society of Gas, Municipal, and General Workers, of which Ward was a member.

Mr. *R. A. S. Browning*, Works Engineer at Nechells, said there are four governors, known respectively as Washwood Heath, Small Heath, Sutton, and Birmingham. The one involved in the accident was the Birmingham governor. This governor stands in a basement about 6 ft. 6 in. below the level of the governor-house floor, and on either side of it are valves for dealing with the inlet and outlet of gas respectively. About six weeks ago, the bell of this governor developed a leak; and it was decided to take the bell out for repair. For this purpose the valves, which in the usual course of working are kept open, were closed. When the governor was dismantled, a leakage of gas from a 3-in. pipe in the internal mechanism of the governor was noticed; and after hearing the report of the man in charge of the job, witness agreed with him that the leakage was from the inlet-valve. At a later stage in his evidence, however, Mr. Browning said it had since been discovered that the leakage came from the outlet-valve, in consequence of the "packing" of the 3-in. pipe. When the leakage from the pipe was first discovered, the escape of gas into the chamber was stopped by placing clay on the top of it. From then until the accident happened the clay was kept intact, and there did not seem to be any increase in the gas in the governor-house. On Monday, Feb. 24, the bell of the governor was returned repaired; and a man named Gordon, who was sent to fit the bell, reported the following day that efforts had been made to tighten the valves, but that no impression could be made on the leakage. It was therefore decided to remove the cover of the top hand-hole on the governor, and replace it by a temporary cover, perforated so that the escaping gas could be passed through 2-in. piping outside the building. To enable this operation to be carried out, a hole 4 ft. 6 in. by 3 ft. was cut in the floor of the basement; and the temporary cover was suspended from a joist over this hole in such a position as to be directly opposite the cover it had to replace. Coming to the time of the accident, witness said a man named Moses Jones was instructed to effect the exchange. Davey and Ward were present in the governor-house; while Gordon was inside the tank alongside the governor. There was no particular smell of gas; but precautions were taken against fire, and the windows were opened wide. Davey put a smoke helmet on Jones, and tied a wet scarf round his own nose and mouth, saying that he would also go down and give a hand if required. Witness told Davey to keep out of the way when Jones took off the cover, and to get round by the outlet valve. Ward at that time was holding the end of the rope, and standing on the governor-house floor directly over the hole. Witness moved him from there towards the corner of the room. He heard the old cover plate drop, and at the same time there was a strong rush of gas. He stood over the opening to see the men complete the job. By that time he was beginning to feel the effects of gas, and he realized that the escape was larger than had been expected. He saw Jones putting-up the plate towards the hole. Davey seemed to be coming out from the corner of the valve to help him; but as he did so, his head fell forward. Jones let go of the plate, and caught hold of Davey, and at the same time Ward ran from the corner of the governor-house towards the hole. Witness told him to get back, and that he would go down with a rope. He caught hold of a rope and proceeded to get down the hole, but must have fallen back unconscious. When he recovered, he was being walked about outside. He gave instructions to the valve-man to shut the outlet-valve of the holder; thus cutting off the supply of gas to the governor. He asked if the two men had been rescued from the basement; and on being told they were still there, he went inside again with the idea of getting down with a rope. He went towards the hole, but was again overcome before he could do anything.

Alfred Davis, a foreman main-layer, employed by Messrs. Whittaker Ellis, said he suggested bagging the main to Gordon on the day of the accident. He did not think at the time, however, the matter was sufficiently important to tell Mr. Tomlinson or Mr. Browning, though he would have reported it had he been in charge of the job.

Moses Jones, a fitter and millwright, the man who took the cover off the hand-hole, was the next witness. He first noticed a rush of gas when the last screw was about to come out. Davey was then holding the cover, in order to take the weight when it was released. Davey reeled, and stumbled against witness, who was on one knee, and they both fell. Witness tried to pick up Davey, but found he was unconscious. He then tried to get out of the basement, but collapsed.

James Gordon, a fitter in the employ of Messrs. Parkinson and W. & B. Cowan, Ltd., said he arrived at Nechells with the repaired bell on Monday, Feb. 24. During the afternoon, he noticed the leakage in the governor-house; and on mentioning it to Mr. Browning, the latter told him measures would be adopted to relieve the position. When the accident happened, he was working in a tank near the governor; but he did not know anything was wrong until he saw someone rushing past and saying something about telephoning. He then saw Jones trying to

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scramble out of the basement, and rescued him, but directly afterwards was overcome himself.

Mr. *E. W. Smith*, D.Sc., Chief Chemist to the Gas Department, said he was instructed last autumn to make certain inquiries concerning gas helmets; and after considering various types, he was more disposed to one of light and simple construction. A helmet of this type was obtained; but the cylinder was found to be defective, and at the time of the accident it was under repair.

In reply to Mr. MINSHULL, witness said the experience of the war had not been helpful in enabling the discovery of a mask suitable for use in gas-works.

Another stage in the inquiry was reached on Friday, when further witnesses were called.

Joseph H. Baggott, one of the three valvemen, said he helped to close the valves of the Birmingham governor in January last, and found that, while the inlet-valve closed well, the outlet-valve was very stiff. It was difficult to say if the latter valve was fully closed; but it was closed as far as they could get it. After that he noticed leakage, and mentioned the matter to Mr. Browning. The first he knew of anything being wrong was hearing a rush of gas, and seeing Mr. Browning collapse. He sent for help, and then, partly gassed himself, was led to the valve-house, where he shut off the valves from the holder. The indicator on the outlet-valve of the Birmingham governor never had been reliable; but no steps to his knowledge had been taken to put it in order. He did not understand the mechanism of the indicator.

Mr. *Walter Chaney*, Engineer at the Saltley works, who was summoned to Nechells after the accident, described the measures he adopted to cut off the supply of gas to the governor, which was finally accomplished by bagging the main.

Mr. DUGGAN submitted that, as bagging was a speedy and inexpensive method of cutting off the supply, it should have been adopted as a first measure, instead of last.

Witness: It is easy to be wise after the event; but as matters have turned out, it would have been a reasonable thing to do.

Mr. *E. B. Tomlinson*, Engineer at the Nechells works, describing the result of investigations after the accident, said the outlet-valve was found to be $4\frac{1}{8}$ in. open at its widest place. At the same time, three broken teeth were discovered; and a piece of one of them was wedged between two others, which would have the effect of preventing the valve from being fully opened. Later, a fourth broken tooth was found; and bright marks on it suggested that it was blocked in winding the valve shut. The inlet-valve was also inspected, and was found to be in good order. After detailing faults discovered in the construction of the outlet-valve, which would not be observable at the time it was installed, he stated that the springs in the valve were found to be broken; and replying to Mr. Harston on this point, he expressed the opinion that they were broken when the valve was new, or immediately they were brought into use. He produced the packing found in the 3-in. pipe, and stated that, had its presence been suspected, an entirely different procedure for the repair of the governor would have been adopted.

Further evidence was taken on Saturday with regard to the safety apparatus used by the firemen in the rescue operations, and the mask belonging to the gas-works.

Mr. J. E. HARSTON expressed his appreciation of the exhaustive manner in which the inquest had been conducted. After an experience of twenty-five years as inspector of factories and of hundreds of inquests, he did not remember a case which had been gone into so exhaustively and clearly. If only facts which were not known had been brought to the notice of the management, that the leakage of the centre-pipe of the governor had been so great as to necessitate the packing, clearly the management would have been seriously to blame if they had not adopted more drastic methods for dealing with the difficulty. But no one mentioned it either to Mr. Tomlinson or Mr. Browning. Consequently, they were only dealing with what was regarded as a simple and easy matter. As to rescue appliances, Mr. Harston said that the work generally in gas-works was not considered dangerous. If it were, it would be certified by the Home Office as dangerous, and special regulations would be issued. This had not been done. Therefore there was no statutory obligation on the part of the Corporation or the gas management to provide safety appliances of any kind; and the evidence showed that the Corporation were doing all they could in providing what safety appliances they regarded as necessary.

The CORONER, in recording a verdict of "Accidental death" in each case, referred to the widespread evidence of courage and devotion to duty on the part of so many persons, both in the gas-works and the fire brigade. Touching on the evidence of Mr. Tomlinson, he referred to the condition of the outlet-valve when it was received from the makers by the Corporation, and said that they knew also the point which Mr. Harston alluded to, that there was no bringing together even of such scraps of knowledge as one man here and there might have; and those who were in authority were not made aware of some things which were essential. In reference to this, he did not like the evidence of one of the witnesses, who had admitted that he did not inform Mr. Tomlinson or Mr. Browning of certain matters. They knew that there was a great outburst of gas which nobody anticipated. The source of the gas was not known; but it was natural to suppose that it was connected with the inlet-valve. Upon the question of smoke helmets or protective apparatus, the Coroner remarked that the evidence would have to be considered by the Corporation. He had been wondering whether they did not need something in the way of a rescue section—some body of men who should be used for rescue work of any kind in the city. As to this particular case, however, the two workmen would not have been saved unless the rescue body were able to be on the spot within a minute or two.

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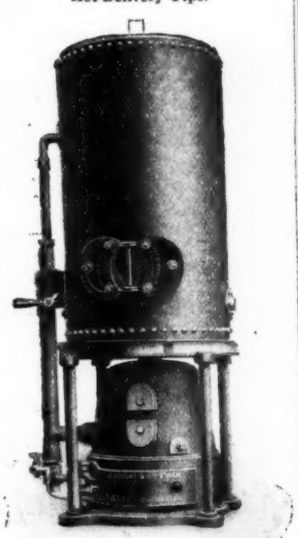

Wright's "B.T.U." Combined Hot-Water Circulator and Storage-Tank,
with Patent "Thermostat" and new "Economy" Valve. Supplied on High or Low Stand.

Hastings Gas Company and the Sliding-Scale.

The following resolution regarding the increasing hardships of an inadequate sliding-scale was unanimously passed at the annual meeting of the Hastings and St. Leonards Gas Company: "That this meeting of stockholders of the Hastings and St. Leonards Gas Company (representing a capital of over half-a-million pounds) hereby protests against the increasing hardships caused to this and other kindred companies by the continued compulsion to supply gas under a sliding-scale which is totally inadequate to meet the changed conditions under which this commodity can now be manufactured. They desire to emphasize their protest upon the following among other grounds: (1) That in spite of the conclusion of the war, the costs of coal and labour conditions now generally obtaining will certainly not return to the level existing previous to 1914; and therefore the costs of gas manufacture in the future render a re-arrangement of the sliding-scale absolutely necessary in common justice to those who are called upon to supply it. (2) That the temporary relief afforded by the Statutory Undertakings Temporary Increase of Charges Act recently passed fails to meet the just necessities of the case. This may be instanced by the fact that, while this Company have in the past six months alone advanced the wages of the manual workers upwards of 30 p.ct., yet the stockholders are receiving 45 p.ct. less value in dividend than in 1914. Until some re-arrangement of the sliding-scale is made, this gross inequality must continue. (3) That stockholders have not only to submit to the loss of nearly one-half of their dividends, but, in addition, have to face an enormous loss by depreciation in the value of their stock. This loss is principally due to the reduction in the rate of dividends paid through the unfair operations of the sliding-scale. The stockholders therefore respectfully request the urgent attention of the Government to the unjust conditions to which this and oher gas companies are at present subjeced, with the fervent hope that the common justice due to them may be no longer delayed. That a copy of this resolution be forwarded to the Board of Trade and to the Borough Member." The report which was adopted on the proposition of the Chairman (Dr. G. G. Gray) stated that the accounts for the half year ended Dec. 31 showed a profit balance of £8528, which was sufficient to meet the reduced statutory dividends and standing charges. The sale of gas was 11½ p.ct. less than in the corresponding period, attributable almost entirely to the Household Fuel and Lighting Order; but as coal and other material were very difficult to obtain, and there was still a shortage of labour, this was not entirely a disadvantage. The labour problem remains acute. The Company paid as wages £9008 in the half year, as compared with £6992 for a larger staff in December, 1913. In July, further assistance was granted to the employees; and in October an award of the Committee on Production gave able-bodied employees the 12½ p.ct. It was while arbitration on this matter was pending that the Company's men ceased work, and thus caused an interruption in the supply of gas to the town, which has been maintained unbroken for over fifty years. So far as possible, and at a greatly increased cost, essential repairs to the Company's plant have been executed; but of necessity such work is in arrear, and (though some provision has been made) will entail considerable expenditure in the near future.

Ilford Gas Company.

There was a decrease of 3·39 p.ct. in the sale of gas by the Company during the six months ended Dec. 31, as compared with the same period of 1917; and the report submitted at the recent meeting stated that this was accounted for by the operation of the Household Fuel and Lighting Order. The Chairman (Mr. W. Ashmole) said the coal difficulty was still acute. They had to cart practically the whole of their coal from the station; and there did not appear to be any hope of increasing the seaborne supplies for some time to come. Their district was particularly residential; and there were already a number of fresh estates earmarked for building purposes. It was therefore quite possible that they might look forward to a very heavy increase in their gas output. To meet this, the question of extensions to the works and plant was being carefully considered; and no doubt there would be need for a large outlay of capital in the near future. After providing for interest charges and income-tax, the balance in the profit and loss account available for division was £19,181, out of which sum dividends were declared for the half year at the rate of 5¾ p.ct. per annum on the "A" and "C" stocks, and 4¼ p.ct. per annum on the "B" stock, less income-tax. These payments will amount to £5164, and leave a balance of £14,017 to be carried forward. The price of gas was 3s. 9d. per 1000 c.ft. up to Michaelmas, and from that date 4s. After the report had been adopted, a resolution was unanimously carried increasing the salary of the Secretary (Mr. G. H. S. Iorns) by £150 per annum.

Quality and Pressure at Sheffield.—At a meeting of the Sheffield City Council last Wednesday, Mr. J. C. Ward asked the Chairman of the Development Committee what steps had been taken to remedy the present unsatisfactory conditions in regard to the quality and pressure of the Sheffield gas supply. Mr. Warlow said the matter had been brought to the notice of the Gas Company by the Council's nominee Directors, and it had been discussed by the Development Committee. The pressure was, and had been for some time, below the statutory requirement, and a report by the Town Clerk as to the legal position and obligations of the Company regarding the testing of gas would be considered at the next meeting of the Development Committee. The whole question of the gas supply was under the consideration of the Committee, who realized the importance of the matter and at the same time recognized the difficulties of the Gas Company.

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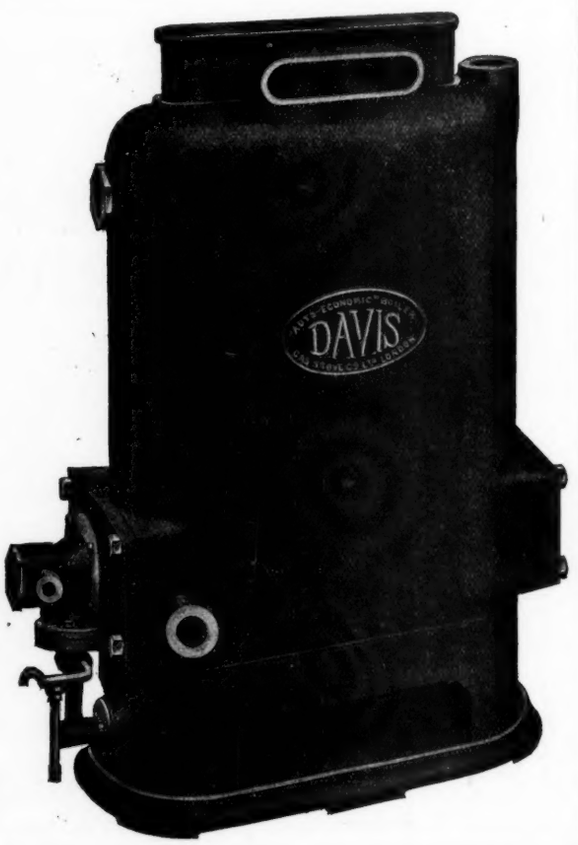

THE ORIGINAL "CUT-OUT-VALVE" IDEA

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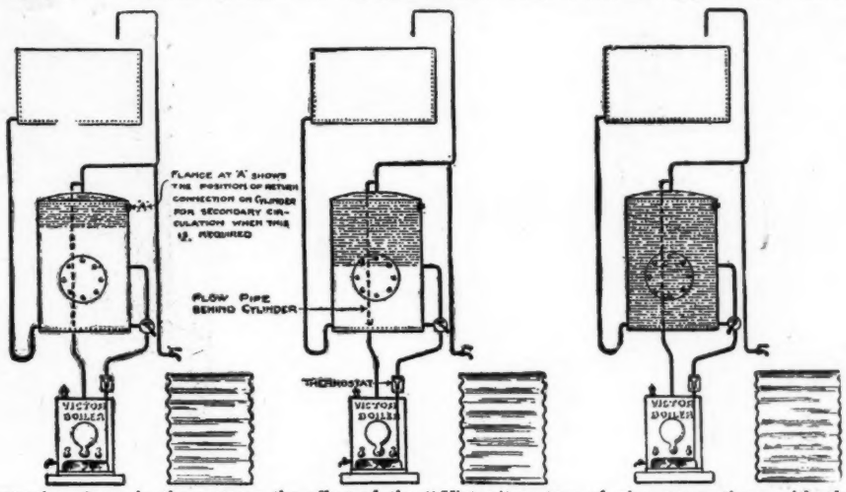
Example of the VICTOR system of Gas-Heated Hot Water Apparatus in circulation.


FLAME AT 'A' SHOWS THE POSITION OF RETURN CONNECTION ON CYLINDER FOR SECONDARY CIRCULATION WHEN THIS IS REQUIRED
FLOW PIPE BEHIND CYLINDER
THERMOSTAT
VICTOR BOILER
VICTOR BOILER
VICTOR BOILER

This illustration shows in three stages the effect of the "Victor" system of pipe connections, with the cut-out valve. Under this arrangement the contents of the cylinder heat from the top, storing the water at the temperature at which it circulates from the boiler—viz., about 150 deg. Fahr. This enables a small supply to be obtained for the sink, heating a few gallons, and shutting off the gas, supposing no further demand exists for the time being.

Working from left to right, the illustrations show the action of drawing water as it should occur, the cold entering the bottom of the cylinder and following the hot water until the whole is exhausted. The cold water should not be allowed to mix with the hot in delivery.

A special feature of Potterton's system is the ability to place water by this means in the storage cylinder at the desired temperature within a few minutes of lighting the gas—*i.e.*, the water having to circulate through the boiler once only. Not only is the supply obtained more quickly by this means, but losses by radiation are cut down also.

The Cut-out Valve fitted in the lower return connection controls the circulation of the lower half of the contents of the cylinder, so that a reduced supply can be held in reserve when baths are not in demand, with economy in gas consumption.

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Gas-Mantles of Enemy Origin.

On Thursday last, the action of *The Attorney-General v. Knopf* came before Mr. Justice Horridge in the King's Bench Division of the High Court of Justice. The Crown asked for the condemnation of four cases of gas-mantles which had been imported into this country in the steamship "Batavier V.," consigned by Firma Stegermann, of Holland, to the Wholesale Guarantee Incandescent Supply Company. The goods had been claimed by Adolph Knopf, of No. 25, Waterloo Road, who denied that they were of enemy origin; but he did not appear to support his claim. The Attorney-General (Sir Gordon Hewart) for the Crown, explained that the goods were seized on Nov. 25, 1915. They were landed at the Customs House Quay consigned to defendant, who traded under the name of the Wholesale Guarantee Incandescent Supply Company. The Commissioners of Customs, having reason to suspect (as the fact was) that the place of origin was an enemy country, directed their seizure. He asked for an order condemning the goods, and that they be forfeited to the Crown. There was no appearance on behalf of defendant. His Lordship therefore made the order as asked, and directed that defendant should also pay the costs.

The Quality of London Gas.—The South-West London Women's Questions Group have adopted a resolution, which they have forwarded to the South Metropolitan Gas Company, as follows: "That this meeting protests against any further deterioration in the quality of the gas, and urges the South Metropolitan Gas Company to restore the gas to its pre-war efficiency." It was pointed out that it took longer now to boil a kettle of water or to heat an oven than in pre-war days, and therefore the cost to the consumer per quarter was increased. There was also a diminution in the lighting power.

Proposed Extensions at the Wombwell Gas-Works.—The proposal to borrow a sum of £24,000 for the installation of new carbonizing plant at the Wombwell Gas-Works has been further discussed at a meeting of the Wombwell Council. Colonel T. W. H. Mitchell, a member of the Council, sent a letter in which he gave notice of his intention to move an amendment to the effect that the matter be allowed to stand over until every means had been exhausted of obviating such a large expenditure. He had ascertained that coke-oven gas could be obtained from the Cortonwood Colliery Company, and he urged that this should be used in preference to going to such a large expense. Mr. Hallsworth favoured Colonel Mitchell's suggestion to defer the scheme, as he did not see how it was possible to get gas into some of the outlying districts by next winter. The Manager of the gas undertaking (Mr. P. D. Walmsley) said it was not possible to obtain a constant supply of coke-oven gas. The Council were, he pointed out, under a statutory obligation to supply their customers, and by having their own carbonizing plant they could do so cheaper than they could obtain gas from the Cortonwood Colliery. It was ultimately decided to apply for the loan.

An Anxious Half-Year at Richmond.

The report which was adopted at the half-yearly meeting of the Richmond (Surrey) Gas Company recommended a dividend at the rate of 3½ p.ct. per annum for the six months on the consolidated ordinary stock—the remark being added: "It is almost unnecessary to state that the reduction in the dividend is due to the cost of coal and freight, the continued increase in labour charges, and the reduction in gas consumption; the last named largely resulting from the rationing regulations of the Coal Controller." The Chairman (Mr. Henry Pullman) said the past half year had been one of the most anxious in the history of the undertaking, due to the scarcity of labour, shortage of coal, and high prices of materials. The very inferior coal received had necessitated the use of a larger quantity than would otherwise have been the case. The quantity carbonized in the six months had been 14,277 tons, as compared with 15,319 tons in the corresponding period of 1917; but the total quantity of gas sold was 16½ p.ct. less. He quoted figures justifying the increase made in the charge for gas; and pointed out that, should it be requisite to still further increase the price, they had the satisfaction of knowing that, under the Temporary Increase of Charges Act, the dividend of the Company could not fall below 3⅜ p.ct. In Mr. E. G. Hutchinson they had found a worthy and able successor to the late Mr. Thomas May, and one under whose guidance satisfactory results were being achieved.

Street Lighting at Stockport.—At the last meeting of the Stockport Town Council, a resolution was moved urging the substitution of electricity for gas for street lighting. On a promise being given that a scheme of improved street lighting would be considered, the resolution was, however, withdrawn.

Wilts County Gas Light and Coke Company.—At the time of its promotion just before the war, investors were warned against the Wilts County Gas Light and Coke Company; and, after a short career, an order for the compulsory winding-up of the concern was made about two years ago. A first and final return to the shareholders has just been announced of 1s. 5½d. per share, or less than 3½d. in the pound.

Death by Misadventure.—A verdict of "Death by misadventure" was returned at an inquest held at Leeds recently on James Barbour, aged 75, of Moorfield Street, Woodhouse, who was found unconscious in bed, with the gas turned on slightly. It seemed that the meter in the house where he lodged was a penny-in-the-slot one, and after he had gone to bed the supply had failed, and been renewed by another penny. The probability appeared to be that the old man had left a small light burning, and this had gone out when the gas failed, and when the penny renewed the supply he had inhaled the gas for the remainder of the night. Dr. Scarth said the man suffered from chronic bronchitis; but he had all the appearances of gas poisoning. The room was small, and he was in a position to render him susceptible to an escape of gas.

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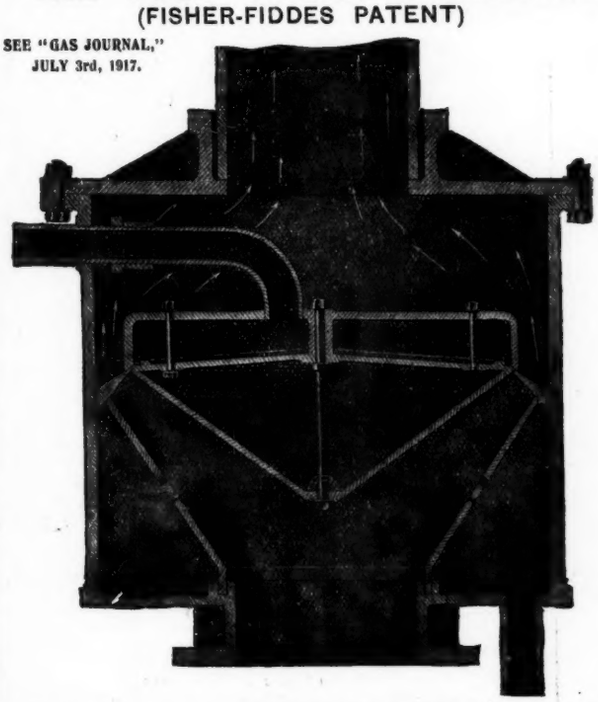
SEE "GAS JOURNAL," JULY 3rd, 1917.



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The Universal Incandescent Light Company, Ltd., has been registered as a private company, with a capital of £10,000, in £1 shares, to acquire from Mr. H. F. S. Smith a secret process for the manufacture within the United Kingdom of artificial silk gas mantles.

Mossley Gas-Workers' Wages.—The Mossley Town Council have decided to refer the application for an increase of wages of the members of the Bolton and District Gas-Workers' Association employed by the Gas and Lighting Committee to the Ministry of Labour, and the application for a reduction of working hours to the Committee appointed by the General Purposes Committee.

Belfast Gas-Works Oil Contract.—The Gas Committee of the Belfast Corporation are making a substantial claim on the Government for loss sustained by interference with the free importation of oil contracted for with the Anglo-American Oil Company for gas-making purposes. The case for the Corporation has been submitted to Sir John Simon for his opinion, prior to the claim being lodged with the Defence of the Realm (Losses) Commission.

Vertical Retorts for Hawick.—Extensive developments are taking place at the works of the Hawick Gas Light Company. Plans were prepared by the Manager, and the scheme discussed at a meeting of the Directors, who have been empowered by the shareholders to instal vertical retorts to supersede horizontal ones. Other improvements are being arranged for, at a total outlay of £30,000. It is estimated that the new retorts will effect a saving of 3000 tons of coal per annum.

Price of Gas at Leeds.—Leeds Gas Committee are considering an increased price for gas. The present charge is 4s. per 1000 c.ft., which may probably rise shortly to 4s. 7d. The pre-war price was 2s. 2d. It is pointed out that coal in 1913 cost 10s. 2d. per ton under contract; but now it costs 22s. 7d. for what Yorkshire coal can be obtained, and 32s. 6d. for Durham coal. The future price will largely depend on a possible advance as an outcome of the Coal Commission's inquiry.

The Problem of Municipal Labour.—At a meeting of the Droylsden Urban District Council, a long discussion took place on the difficulty of securing workers for the gas undertaking and other municipal departments. Mr. C. Axon stated that in Droylsden they paid the same rate of wages in all departments as in Manchester; but they could not get men to start. In all departments they were carrying on with the utmost difficulty. Plenty of men applied for work; but when they heard the wages, they went away and took work at Manchester on the same scale.

A Bogus Gas Inspector.—A thief posing as a gas-meter inspector has been carrying on operations in several Manchester districts during the past week or two; but so far he has eluded capture by the police. The man gains admission to houses by pretending that he has been sent from the Town Hall to inspect the gas-fittings. On being admitted, he adopts the ruse of getting the occupier to procure a screw-driver, on the pretext that some of the fittings require taking down. Before the occupier returns, the man makes off with any booty that may lie close at hand.

"Lights Off" at a Military Dance.—What is said to have been a reprisal for "military disrespect" shown to the Sinn Fein flag in Sligo occurred in the Town Hall there, when the gas was cut off during a military dance, and, as there was no possibility at the time of restoring the connection, the function had to be abandoned. The gas-main which is 4 in. in diameter, was tapped and plugged in a manner that showed considerable mechanical skill. The work was done in a chamber which is usually kept locked and which is approached by a long winding passage. There has so far been no clue to the perpetrators.

Perth and National Gas Council Representatives.—At a meeting of the Perth Town Council, a discussion took place as to the two representatives who should attend the National Gas Council meetings. The Lord Provost of Perth objected to the Gas Manager, a paid servant, representing the Council. What action he chose to take, they would have to fall in with; and his proper place was in Perth, advising the Council. Ex-Bailie Macpherson said that many technical questions would arise at the Gas Council meetings, which the Convener of the Gas Committee could not be expected to understand; and the Gas Manager would be there to advise him. Ultimately it was agreed to appoint the Convener and the Gas Manager as the two representatives; the Convener to have the power to vote, and the Gas Manager to be there to guide him in technical matters.

Dublin Gas Workers' Claim.—At a meeting representative of the Alliance and Dublin Consumers' Gas Company and their workers in the Dublin, Kingstown, and Bray depôts with Mr. Gordon Campbell, of the Ministry of Labour (Ireland), the latter suggested terms of settlement of the wages demands; and it was agreed that a threatened strike should be postponed pending their consideration. A general meeting of the gas workers was afterwards held in Dublin, and unanimously rejected the offer, but decided to continue work until to-morrow, in view of the agreement referred to. Between 800 and 1000 men are involved. The demand is for increases of 12s. a week and a 44-hour week. During the negotiations, the Company offered an increase of 5s. a week, without reduction of hours, to the shift men, and of 2s., with a 47-hour week; but this was declined.

Wages at Ossett.—In the Ossett Town Council, Mr. Peace required an explanation of a Gas Committee resolution that a wage increase asked for by the General Workers' Federation be not granted, as they considered the time inopportune. Alderman Harvey Robinson, the Chairman of the Committee, said the contention was that, up to the time of the last increase, the advances were such as would meet the extra cost of living, the cost not having since gone up, and the Prime Minister held out hopes of a reduction shortly. The application in question was for an extra 10s. for men of 21 years of age and over, and 5s. to youths, with a request for a 44-hour week. The increases would cost £1346 a year; and if the reduced working week were conceded, the cost would be £2633, or the reduction of hours without the advance wage would cost £1287. The Committee's resolution was approved.

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Ennis Gas-Works to Close.—The Ennis (co. Clare) Gas Consumers' Company have decided to close down their works on or before May 1, owing to coal supply difficulties. The present price of gas under the Company is 12s. 6d. per 1000 c.ft., which is said to be the highest in Ireland.

Profit-Sharing at Watford.—A small decrease in the quantity of gas sold (due entirely to rationing restrictions) was reported at the half-yearly meeting of the Watford Gas Company; and the Directors again drew attention to the heavy increase in expenditure—coal and oil prices having advanced 15 p.ct., wages 50 p.ct., and war bonuses 35 p.ct. The revenue account showed a profit of £4757, and the profit and loss account, after providing for interest on mortgages and loans, a balance of £2987. The statutory dividends were declared. The Chairman (Mr. E. J. Slinn) said the bonus under their co-partnership scheme had disappeared in consequence of the increase in the price of gas to 3s. 8d. per 1000 c.ft.; but after consideration the Directors had decided to carry on the scheme by cutting out the sliding-scale bonus provision, and granting a sum annually equal to 3 p.ct. on salaries and wages—contributions to the savings fund by employees to be voluntary.

A Smaller Consumption at Worthing.—It was stated in the report adopted at the half-yearly meeting of the Worthing Gas Light and Coke Company that the statement of accounts for the six months ended Dec. 31 disclosed results which, though expected, were none the less disappointing. The restriction on lighting imposed by the Fuel and Lighting Order explained the fall in the receipts for gas amounting to £682; the total quantity sold being 7 p.ct. less than in 1917. A reduction of £932 in residual products had been largely caused by the use of inferior coal which the Company had been forced, through the operation of Government control, to use in substitution for their contract coals. Wages again showed a considerable increase, which had added to the many difficulties with which the Directors had had to contend. The increase under this head was £740 for the half year. These abnormal items of expenditure compelled the Directors to raise the price of gas, as from Jan. 1, from the standard rate of 4s. to 4s. 4d. per 1000 c.ft., with the result that the dividend became automatically reduced by 10s. p.ct. owing to the operation of the sliding-scale. The profit and loss account showed a balance of £20,242. Out of this sum the Directors recommended the declaration of a dividend at the rate of 4½ p.ct. per annum (less income-tax) upon the ordinary stock.

STOCK MARKET REPORT.

LAST week the general aspect and position of affairs on the Stock Exchange was almost an exact counterpart or reflection of what it had been the week before. And this was not to be wondered at, for the same dispiriting factors were in full play. Progress in the coal inquiry is hampered by the unavoidable ignorance of some questioners as to what constitutes evidence; conflicting claims made rocky the path of the Peace Conference; and other sources of apprehension to which we adverted last week were equally operative in checking enterprise. Indeed, the dearth of business last week was even more pronounced.

In the gilt-edged market the dulness was somewhat relieved by a bright point or two. In Home Government issues, the 5 p.ct. War Loan held its own well, and closed fractionally better; but Consols could not keep in step. Home Rails moved irregularly; but local lines were advantaged by Channel Tunnel possibilities. Canadians went badly up till near the close, when they partially recovered, and Argentines had a like history.

In the Foreign Market, French Loans rose freely, but were steadied at last by some realizing of profits. Japanese and Mexican continued firm. In the Miscellaneous department, dulness was the chief characteristic, largely owing to industrial unrest at home and abroad.

Business in the Gas market was perceptibly quieter. Not a dozen undertakings altogether were dealt in at all, and of these some contributed only a single bargain apiece, while none of the rest approached the level of an ordinary week's work. Movements were irregular; but, on the whole, the tone was fair. In Metropolitans, Gas Light and Coke and Commercial were steady; but South Metropolitan lost another point. In Suburbans, many issues were quoted *ex div.* with the turn in their favour. Brentford debenture also rose 1. In Continentals, Imperial Continental and Continental Union scarcely maintained their prices of the week before; but their quotations stood. Primitiva shares of both issues were weaker, and their quotations fell.

Bargains done for cash during the week were as follows: On Monday, British 32, Commercial 4 p.ct. 64, Continental Union 49, Gaslight ordinary 63½, 64, 64¼, Imperial Continental 116, 117, South Metropolitan 68, 68¼, 68½, 68⅜, South Suburban debenture 90. On Tuesday, Brentford debenture 65, 65½, Commercial 4 p.ct. 64½, Continental Union preference 70, Gaslight ordinary 64, 64¼, ditto debenture 56¼, Imperial Continental debenture 73⅜, Primitiva 30s, ditto preference 52s. 6d., South Metropolitan 68. On Wednesday, Bristol 84, Commercial 4 p.ct. 64½, Continental Union 48½, Gaslight ordinary 63½, 63⅝, 64¼, ditto maximum 55½, ditto preference 70½, 71, ditto debenture 56½, Imperial Continental 116, 116½, 117, ditto debenture 73, Primitiva 30, ditto preference 50s., 52s. 6d., ditto debenture (1911) 47. On Thursday, British 32, Commercial 4 p.ct. 63½, Gaslight ordinary 64, ditto maximum 56½, ditto debenture 56, Imperial Continental, 116, 116½, 117, 117½, ditto debenture 73½, South Metropolitan 68, Crediton 5, Richmond 5 p.ct. debenture 81. On Friday, Commercial 4 p.ct. 65, Gaslight ordinary 63⅝, 64½, ditto preference 70½, Imperial Continental 116, 116½, 116½, 117, 117½, South Metropolitan 67½.

The Money Market ruled easy until near the close, when it promised increased firmness. The bank rate is 5 p.ct., as fixed on April 5, 1917.

ANTE-WAR PRICES AND DIVIDENDS, LATEST DIVIDENDS, AND LAST WEEK'S BARGAINS.

Issue. £	Share.	When ex-Dividend.	Ante-War Dividend & Bonus p.c.	Last Dividend.	NAME.	Closing Prices. July 30, 1914.	Present Prices.	Lowest and Highest Prices of Bargains.
182,049	Stk.	Mar. 10	4	4%	Aldershot 4 p.c. Pref.	..	62—67*	..
1,551,868	"	April 8	2½	4⅜	Alliance & Dublin Ord.	59—64	48—50	..
374,000	"	July 10	4	4%	Do. 4 p.c. Deb.	76—79	61—63	..
280,000	5	April 29	7½	8%	Bombay, Ltd.	5⅞—6⅛	5⅞—6¼	..
50,000	10	Feb. 26	16	12%	Bournemouth Gas and Water { 10 p.c.	20—30	21—23	..
888,110	10	"	7	7%	B 7 p.c.	15—15½	10—11	..
115,000	10	"	6	6/-	Pref. 6 p.c.	13½—14	9—9½	..
159,740	—	—	—	4%	4 p.c. Deb.	..	66—68	..
992,045	Stk.	Feb. 26	14	37/-	Brentford A Consolid.	261—266	76—79	..
784,990	"	"	11	31/8	Do. B New	204—209	70—75	..
55,000	"	"	5	5%	Do. 5 p.c. Pref.	109—111	75—80	..
221,400	"	June 11	4	4%	Do. 4 p.c. Deb.	91—98	64—66	65—65½
217,880	"	Feb. 26	11	7½%	Brighton & Hove Orig.	208—213	140—145	..
344,200	"	"	8	5½%	Do. A Ord. Stk.	154—159	97—102	..
933,500	Stk.	—	5	5%	Bristol 5 p.c. max.	..	..	84
580,000	20	Mar. 26	12½	10%	British	44—45	31½—32½	32
120,000	Stk.	June 26	4	4%	Do. 4 p.c. Deb. Stk.	88—90	64—66	..
245,771	"	"	4	4%	Buenos Aires 4 p.c. Deb.	85—87	50—53	..
100,000	10	—	—	—	CapeTown & Dis., Ltd.	1½—2½	3⅞—4½	..
100,000	10	—	—	4½%	Do. 4½ p.c. Pref.	4—6	7⅛—8½	..
100,000	Stk.	June 26	4½	4½%	Do. 4½ p.c. Deb. Stk.	70—75	60—65	..
157,150	"	Feb. 26	5	5%	Chester 5 p.c. Ord.	108—110	..	..
1,518,280	"	Feb. 12	5/9/4	30/-	Commercial 4 p.c. Stk.	106—108	62—65	63½—65
560,000	"	"	5⅓	26/8	Do. 3½ p.c. do.	103—105	59—62	..
475,000	"	June 11	8	8%	Do. 3 p.c. Deb. Stk.	69½—71½	51—53	..
800,000	"	"	4	—	Continental Union Ltd.	76—79	48—53	48½—49
200,000	"	"	7	—	Do. 7 p.c. Pref.	115—118	70—75	70
51,600	Stk.	Aug. 29	14½	12½%	Croydon A 10 p.c.	..	155—165	..
278,400	—	"	11½	9½%	Croydon B and C 7 p.c.	..	130—135	..
493,270	Stk.	—	6	5½%	Derby Con. Stk.	128—125	..	..
55,000	"	—	4	4%	Do. Deb. Stk.	103—104	..	..
1,009,180	10	July 29	10	5/0	European, Ltd.	17½—18	12½—13½	..
16,998,975	Stk.	Feb. 10	4/17/4	30/-	Gas { 4 p.c. Ord.	98—102	63—65	63½—64½
2,600,000	"	"	8½	26/8	Light { 3½ p.c. max.	76—79	55—57	55½—56½
4,062,235	"	"	4	4%	and { 4 p.c. Con. Pref.	96—99	70—72	70½—71
4,674,850	"	June 11	8	8%	Coke { 3 p.c. Con. Deb.	72½—74½	56—58	56—56½
180,000	"	"	10	10%	10 p.c. Bonds	..	..	..
82,500	"	Mar. 12	5	4½%	Hastings & St. L. 5 p.c.	..	59—64*	..
258,740	"	—	3½	2½%	Do. 3½ p.c.	37—39	44—49*	..
70,000	10	April 29	11	8%	Hongkong & China, Ltd.	16½—16½	7⅛—8½	..
86,600	Stk.	Sept. 12	9	8½%	Hornsey 7 p.c.	..	115—120*	..
181,000	"	Mar. 12	7½	5½%	Ilford A and C.	151—154	90—95*	..
65,780	"	"	6⅔	4½%	Do. B	115—118	69—74*	..
65,500	"	June 26	4	4%	Do. 4 p.c. Deb.	92—94	62—65	..
4,940,000	"	May 14	9	4½%	Imperial Continental	150—160	116—121	116—117½
1,235,000	"	Feb. 12	8½	5½%	Do. 5½ p.c. Deb. Red.	84—86	72—74	73—73½
335,342	"	Mar. 12	6½	6½%	Lea Bridge Ord. 5 p.c.	119—121	93—98	..
2,498,905	"	Feb. 26	10	42/6	Liverpool 5 p.c. Ord. { A	211—213	..	..
					{ B	146—148	..	..
806,088	"	June 26	4	4%	Do. 4 p.c. Pr. Deb. Stk.	..		
165,736	"	Aug. 15	4½	3½%	Maidstone 5 p.c.	..	58—63	..
75,000	5	June 11	5	3%	Malta & Mediterranean	4½—4⅝	3½—3⅝	..
250,000	100	April 1	4½	4½%	Met. of Melbourne { 4½ p.c. Deb.	99—101	90—97	..
541,920	20	May 28	4	6/-	Monte Video, Ltd.	11½—12	9⅜—9⅞	..
1,875,892	Stk.	July 29	4½	3½%	Newcastle&Gateh'd Con.	98½—99½	70½—71½	..
529,795	"	June 26	3½	3½%	Do. 3½ p.c. Deb.	82—88	57—59	..
55,940	10	Feb. 26	7/14/0	7½%	North Middlesex 7 p.c.	14—15	9½—9⅝*	..
900,000	Stk.	May 14	8	8%	Oriental, Ltd.	117—122	103—106	..
60,000	5	Mar. 26	10	1/-	Ottoman, Ltd.	7½—7⅞	4⅜—5½	..
60,000	50	Feb. 26	13	7½%	Portsea, Island B	128—131	76—81	..
100,000	50	"	12	6½%	Do. C	118—121	58—63	..
249,980	5	April 29	8	—	Primitiva Ord.	5½—6	1½—1⅝	30/-
499,960	5	June 26	5	—	Do. 5 p.c. Pref.	4⅝—5	2½—2⅝	50/—52/6
521,600	100	June 2	4	4%	Do. 4 p.c. Deb.	91—98	74—76	..
600,000	Stk.	July 31	4	4%	Do. " " 1911	..	46—49	47
346,198	"	June 26	4	4%	River Plate 4 p.c. Deb.	85—87	48—52	..
150,000	10	May 14	6	6/-	San Paulo { 6 p.c. Pref.	10½—11	7⅛—8½	..
125,000	50	July 1	5	5%	{ 5 p.c. Deb.	47—49	40—43	..
186,000	Stk.	Mar. 12	10	5%	Sheffield A	228—224	85—87	..
209,984	"	"	10	5%	Do. B	222—224	85—87	..
528,500	"	"	10	5%	Do. C	220—222	84—86	..
133,201	Stk.	Sept. 12	4	4%	Shrewsbury 5 p.c.	..	..	..
90,000	10	May 28	9	6/-	South African.	10½—11½	13—14	..
6,509,895	Stk.	Feb. 10	5/4/0	30/-	South Met. 4 p.c. Ord.	111—113	67—69	67½—68½
250,000	"	July 12	—	5%	Do. Pref.	..	95—97	..
1,895,445	"	July 10	8	8%	Do. 5 p.c. Deb.	72½—74½	54—56	..
224,220	"	Feb. 26	8½	5%	South Shields Con. Stk.	157—159	112—114	..
952,795	"	"	6	3½%	S'th Suburb'n Ord. 5 p.c.	114—116	76—79	..
167,558	Stk.	June 26	5	5%	Do. 5 p.c. Deb. Stk.	116—118	89—92	90
647,740	"	May 14	8	8%	Southampton Ord.	99—102	69—71	..
120,000	"	Feb. 12	7½	4½%	Tottenham { A 5 p.c.	135—138	90—95	..
792,275	"	"	6	3%	District { B 5½ p.c.	115—117	65—67	..
181,255	"	June 26	4	4%	{ 4 p.c. Deb.	87—89	64—66	..
182,880	10	Dec. 30	6	—	Tuscan, Ltd.	5—6	1—2	..
149,900	10	July 1	5	5%	Do. 5 p.c. Deb. Red.	93—95	45—50	..
286,476	Stk.	Mar. 12	5	5%	Tynemouth 5 p.c. max.	108½—109	85—86*	..
					Wandsworth, Wimbledon, and Epsom—			
80,000	"	Feb. 26	8⅜	55/-	Wandsworth A 5 p.c.	151—156	88—93	..
255,686	"	"	6⅔	40/-	Do. B 3½ p.c.	129—134	68—73	..
108,075	"	"	—	38/6	Do. C	..	68—73	..
140,865	"	"	—	38/6	New Ordinary	..	68—73	..
352,000	"	"	6⅓	35/9	Wimbledon 5 p.c.	117—122	68—73	..
98,000	"	"	6⅔	40/-	Epsom 5 p.c.	121—126	70—75	..
88,416	"	June 26	3	3%	3 p.c. Deb. Stk.	66—69	50—52	..

* *Ex div.*

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